



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR06081100		Roll Width: 15.0 feet		Test Date: 1/20/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-l)				
			CD (lbs)	CD (%)	CD (lbs)				(cm/sec)				
130114550	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5
130114551	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5
130114552	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5



Roll No.	Mass per Unit Area	Thickness	Grab Strength		Grab Elongation		Trap Tear Strength		Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability	
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	MD (%)	CD (%)	MD (lbs)	CD (lbs)	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491	
	(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(lbs)	(psi)	(mm)	(sec-L)	(cm/sec)
130114538	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114539	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114540	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114541	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114542	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114543	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114544	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5



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Roll Test Data Summary - English Units

Product : NW6	Item Code: FBR0608100	Roll Width: 15.0 feet	Test Date: 1/20/2002						
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114534	7.2	95	223 264	97 120	122 171	133	410	0.212	1.9 0.5



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Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100			Roll Width: 15.0 feet		Test Date: 1/20/2002		
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261 (oz/yd ²)	ASTM D 5199 (mils)	ASTM D 4632 MD (lbs) CD (lbs)	ASTM D 4632 MD (%) CD (%)	ASTM D 4533 MD (lbs) CD (lbs)	ASTM D 4833 (lbs)	ASTM D 3786 (psi)	ASTM D 4751 (mm)	ASTM D 4491 (sec-ft) (cm/sec)
130114523	6.4	91	209 230	96 108	107 131	120	342	0.212	2.1 0.5
130114524	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114525	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114526	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114527	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114528	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114529	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114530	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114531	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114532	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5



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Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	ASTM D 4751	ASTM D 4491
130114638	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114639	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114640	6.9	94	227 257	105 116	144 167	118	358	0.212	1.9 0.4
130114641	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114642	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114643	6.9	94	227 257	105 116	144 167	118	358	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NNB		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trup Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114836	8.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261 (oz/yd ²)	ASTM D 5199 (mils)	ASTM D 4632 MD (lbs) CD (lbs)	ASTM D 4632 MD (%) CD (%)	ASTM D 4533 MD (lbs) CD (lbs)	ASTM D 4833 (lbs)	ASTM D 3786 (psi)	ASTM D 4751 (mm)	ASTM D 4491 (cm/sec)
130114634	7.5	102	243 276	91 116	124 147	137	394	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Moss per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114589	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4

Roll Test Data Summary - English Units

Test Date: 1/20/2002

Product: NWS		Item Code: FER0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Graib Strength	Graib Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(cm-1)
									(cm/sec)
130114579	7.1	95	257 248	102 128	167 152	130	387	0.212	1.9 0.5
130114580	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114581	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114582	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114583	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114584	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114585	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114586	7.0	93	239 250	90 118	135 136	120	390	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-ft) (cm/sec)
130114569	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114570	7.1	94	249 240	94 120	145 154	117	361	0.212	1.9 0.5
130114571	7.1	94	249 240	94 120	145 154	117	361	0.212	1.9 0.5
130114572	7.1	94	249 240	94 120	145 154	117	361	0.212	1.9 0.5
130114573	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114574	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114561	7.2	95	255	90	155	184	354	0.212	1.9 0.5
130114562	7.2	95	255	90	155	184	354	0.212	1.9 0.5
130114563	7.2	95	255	90	155	164	354	0.212	1.9 0.5
130114564	7.2	95	255	90	155	164	354	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability Permeability



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (ASTM D 5199) (oz/yd ²)	Thickness (mils)	Grab Strength ASTM D 4632 MD (lbs) CU (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114535	7.2	95	223 284	97 120	122 171	133	410	0.212	1.9 0.5
130114536	7.2	95	223 284	97 120	122 171	133	410	0.212	1.9 0.5
130114537	7.2	95	223 284	97 120	122 171	133	410	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
190114533	6.8	104	211 240	84 127	97 139	117	375	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Atullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
	(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	(psi)	(mm)	(sec-l) (cm/sec)				
13011409	6.3	88	224	222	96	118	102	128	118	337	0.212	2.1	0.5
130114500	6.5	88	238	204	84	120	104	109	115	334	0.212	2.1	0.5
130114501	6.5	88	236	204	84	120	104	109	115	334	0.212	2.1	0.5
130114502	6.5	88	236	204	84	120	104	109	115	334	0.212	2.1	0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114478	6.6	93	240 231	90 121	123 136	127	384	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4333	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114475	6.8	93	240	90	123	136	127	0.212	2.1
			231	121			364		0.5

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mil)	(sec-l) (cm/sec)
130114470	6.8	93	240 231	90 121	123 136	127	384	0.212	2.1 0.5
130114471	6.6	93	240 231	90 121	123 136	127	364	0.212	2.1 0.5
130114472	6.6	93	240 231	90 121	123 136	127	384	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 test		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(cc-1) (m/sec)
130114466	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114467	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114468	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FDR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114460	6.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114461	6.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114462	6.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114463	6.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114464	6.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 2/1/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130115859	7.0	86	232 237	84 114	118 128	143	408	0.212	1.8 0.4
130115860	6.7	92	257 218	83 111	107 101	126	373	0.212	1.8 0.4
130115861	6.7	92	267 218	83 83	107 101	126	373	0.212	1.8 0.4
130115862	6.7	92	257 218	83 83	107 101	126	373	0.212	1.8 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 2/1/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-I) (cm/sec)
130115846	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115847	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115848	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115849	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115850	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115851	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 2/1/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130115828	7.0	96	232 237	84 114	118 128	143	408	0.212	1.8 0.4
130115829	7.0	96	232 237	84 114	118 128	143	408	0.212	1.8 0.4
130115830	7.0	96	232 237	84 114	118 128	143	408	0.212	1.8 0.4
130115831	7.0	96	232 237	84 114	118 128	143	408	0.212	1.8 0.4
130115832	7.0	98	232 237	84 114	118 129	143	408	0.212	1.8 0.4
130115833	7.0	96	232 237	84 114	118 128	143	408	0.212	1.8 0.4
130115834	6.9	87	220 233	99 121	103 110	123	373	0.212	1.8 0.4
130115835	6.9	87	220 233	99 121	103 110	123	373	0.212	1.8 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mil)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permeability ASTM D 4491 (sec-l) (cm/sec)
130114517	6.4	91	209 230	96 106	107 131	120	342	0.212	2.1 0.5
130114518	6.4	91	209 230	96 106	107 131	120	342	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114509	6.5	88	236 204	84 120	104 109	115	334	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114088	6.7	91	243 232	93 116	103 128	118	351	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NW6		Item Code: FAR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114085	6.7	91	243 MD 232 CD	93 MD 115 CD	103 MD 128 CD	118	351	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114091	8.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5
130114092	6.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114088	6.6	88	211 238	84 110	108 132	117	388	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114082	6.6	89	211 239	94 110	108 132	117	358	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 11/01/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114075	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114076	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114077	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114078	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114079	6.6	89	211 239	94 110	108 132	117	358	0.212	2.1 0.5
130114080	6.6	89	211 239	94 110	108 132	117	358	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FDR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114072	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114088	6.7	94	235 245	95 107	104 125	138	356	0.212	2.1 0.5



GSE Nonwoven Technologies

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114084	6.7	94	235 245	95 107	104 125	138	356	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	CD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114061	6.7	94	235	245	95	107	104	125	136
									0.212
									2.1
130114062	6.7	94	235	245	95	107	104	125	136
									0.212
									2.1
									0.8



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW08		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs)	Grab Elongation ASTM D 4632 MD (%)	Trap Tear Strength ASTM D 4533 MD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114048	8.7	96	232	93	123	131	364	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114045	6.7	96	232 250	93 110	123 131	129	364	0.212	1.5 0.4
130114046	6.7	96	232 250	93 110	123 131	128	364	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114036	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4



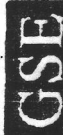
GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114034	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114031	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4
130114032	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114028	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002				
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs)	Grab Elongation ASTM D 4632 MD (%)	Trap Tear Strength ASTM D 4533 MD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)	
130114027	6.8	95	247	97	110	128	120	0.212	1.5 0.4	



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NW6		Item Code: FBR0608100			Roll Width: 15.0 feet		Test Date: 1/8/2002						
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4333	ASTM D 4833	ASTM D 3786	ASTM D 4751	Permeability				
	(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	ASTM D 4491				
							(psi)	(mm)	(sec-l)				
									(cm/sec)				
130113973	7.2	99	255	229	95	125	115	156	133	376	0.212	1.7	0.4
130113974	7.2	99	255	229	95	125	115	156	133	376	0.212	1.7	0.4
130113975	7.2	99	255	229	95	125	115	156	133	376	0.212	1.7	0.4
130113976	7.2	99	255	229	95	125	115	156	133	376	0.212	1.7	0.4
130113977	7.2	99	255	229	95	125	115	156	133	376	0.212	1.7	0.4
130113978	7.2	99	255	229	95	125	115	156	133	376	0.212	1.7	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/8/200			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130113959	6.4	85	227 226	83 107	109 122	124	339	0.212	1.7 0.4

GSEGSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/200			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114047	6.7	96	232 250	93 110	123 131	129	364	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114059	6.7	94	235 245	95 107	104 125	136	356	0.212	2.1 0.5
130114060	6.7	94	235 245	95 107	104 125	136	356	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114096	6.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5
130114097	6.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114099	6.9	94	248 233	86 112	111 125	129	374	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6			Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20						
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
ASTM D 5261	ASTM D 5199		ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd2)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)				
130114255	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114256	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114257	7.9	115	266	279	94	132	158	180	152	350	0.212	1.5	0.4
130114258	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114259	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114260	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114261	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114262	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114263	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114264	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114265	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114266	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114267	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114268	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114269	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114270	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114271	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114272	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114273	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114274	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114275	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114276	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114277	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114278	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114279	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114280	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114281	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114282	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114283	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114284	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	(oz/yd2)	(mils)	ASTM D 5199	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
			MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(sec-1) (cm/sec)
130114289	7.5	108	235	260	117	123	142	142	1.5 0.4
130114290	7.5	108	235	260	117	123	142	142	1.5 0.4
130114291	7.2	111	222	232	107	128	152	128	1.5 0.4
130114292	7.2	111	222	232	107	128	152	128	1.5 0.4
130114293	7.2	111	222	232	107	128	152	128	1.5 0.4
130114294	7.2	111	222	232	107	128	152	128	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114297	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4
130114298	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114301	6.8	81	195 200	65 86	135 125	111	355	0.212	1.5 0.4
130114302	6.8	81	195 200	65 86	135 125	111	355	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz _l yd ₂)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114308	6.8	81	195 200	65 86	135 125	111	355	0.212	1.5 0.4
130114309	6.8	81	195 200	65 86	135 125	111	355	0.212	1.5 0.4
130114310	6.8	81	195 200	65 86	135 125	111	355	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114305	6.8	81	195 200	65 86	135 125	111	355	0.212	1.5 0.4
130114306	6.8	81	195 200	86 86	135 125	111	355	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114312	7.4	105	232 255	112 118	117 132	131	359	0.212	1.5 0.4

TENAX CORPORATION

GEOCOMPOSITE REPORT

PRODUCT :

Tendrain 570-2

JOB:

County of Volusia LF

LOT #

2

DATE:

02/07/2001

COMPOSITE #	NET #	TEXTILE #	TEXTILE #	Roll Length	# of rolls in lot
200276	0200012	130114541	130114596	200	1
200277	0200012	130114541	130114601	151	2
200278	0200013	130114485	130114484	200	3
200279	0200013	130114485	130114484	200	4
200280	0200013	130114485	130114484	200	5
200281	0200013	130114485	130114484	200	6
200282	0200013	130114485	130114484	200	7
200283	0200013	130114479	130114484	200	8
200284	0200013	130114479	130114489	200	9
200285	0200013	130114479	130114489	200	10
200286	0200013	130114479	130114489	200	11
200287	0200014	130114479	130114489	200	12
200288	0200014	130114315	130114489	200	13
200289	0200014	130114315	130114487	200	14
200290	0200014	130114315	130114487	200	15
200291	0200014	130114315	130114487	200	16
200292	0200014	130114315	130114487	200	17
200293	0200014	130114486	130114487	200	18
200294	0200014	130114486	130114487	200	19
200295	0200014	130114486	130114487	175	20
200296	0200015	130114486	130114490	200	21
200297	0200015	130114486	130114490	200	22
200298	0200015	130114486	130114490	200	23
200299	0200015	130114319	130114490	200	24
200300	0200015	130114319	130114508	200	25
200301	0200015	130114319	130114508	200	26
200302	0200015	130114319	130114508	200	27
200303	0200015	130114319	130114508	200	28
200304	0200015	130114319	130114508	200	29
200305	0200016	130114510	130114503	200	30
200306	0200016	130114510	130114503	200	31
200307	0200016	130114510	130114503	200	32
200308	0200016	130114510	130114503	200	33
200309	0200016	130114510	130114503	200	34
200310	0200016	130114100	130114506	200	35
200311	0200016	130114100	130114506	200	36
200312	0200016	130114100	130114506	200	37
200313	0200016	130114100	130114506	200	38
200314	0200017	130114316	130114306	200	39
200315	0200017	130114316	130114318	200	40
200316	0200017	130114316	130114318	200	41
200317	0200017	130114316	130114318	200	42

TENAX CORPORATION

GEOCOMPOSITE REPORT

PRODUCT :

Tendrain 570-2

JOB:

County of Volusia LF

LOT #

2

DATE:

02/07/2001

COMPOSITE #	NET #	TEXTILE #	TEXTILE #	Roll Length	# of rolls in lot
200318	0200017	130114316	130114318	200	43
200319	0200017	130114515	130114318	200	44
200320	0200017	130114515	130114317	200	45
200321	0200017	130114515	130114317	200	46
200322	0200017	130114515	130114317	200	47
200323	0200018	130114515	130114317	200	48
200324	0200018	130114514	130114317	200	49
200325	0200018	130114514	130114313	200	50
200326	0200018	130114514	130114313	200	51
200327	0200018	130114514	130114313	200	52
200328	0200018	130114514	130114313	200	53
200329	0200018	130114512	130114313	200	54
200330	0200018	130114512	130114483	200	55
200331	0200018	130114512	130114483	200	56
200332	0200019	130114512	130114483	200	57
200333	0200019	130114512	130114483	200	58
200334	0200019	130114038	130114483	200	59
200335	0200019	130114038	130114035	200	60
200336	0200019	130114038	130114035	200	61
200337	0200019	130114038	130114035	200	62
200338	0200019	130114038	130114035	200	63
200339	0200019	130114038	130114035	200	64
200340	0200019	130114311	130114035	200	65
200341	0200019	130114311	130114516	200	66
200342	0200020	130114311	130114516	200	67
200343	0200020	130114311	130114516	200	68
200344	0200020	130114311	130114516	200	69
200345	0200020	130114051	130114028	200	70
200346	0200020	130114051	130114028	200	71
200347	0200020	130114051	130114028	200	72
200348	0200020	130114051	130114028	200	73
200349	0200020	130114051	130114028	200	74
200350	0200020	130114513	130114028	200	75

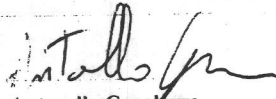


Corporation

4800 East Monument Street
Baltimore, Maryland 21205Office: 410-522-7000
Fax: 410-522-7015Order Line: (800) 356-8495
Waste Mgt: (800) US-GRIDS**Transmissivity Test Data**
ASTM D 4716-95

Product	Tendrain 570-2					TEST CONFIGURATION		
Lot #	2					Plate		
Roll Size	6.7' x 200'					Sand		
Project	Volusia County Landfil					Tendrain 570-2		
Specimen Size	12" x 14"					Geomembrane		
Testing Lab	Tenax					Plate		
		Geocomposite Roll	Testing Date	Load (psf)	Seating Period (hrs)	Gradient	Transmissivity (m2/sec)	Specification (m2/sec)
		0200276	02/07/2002	5000	1	0.02	1.56E-02	4.00E-04

Tested by


Antonello Capalozza

Date 02/07/2002

Checked by


Christine Caropresso

Date 02/07/2002



Corporation

4800 East Monument Street
Baltimore, Maryland 21205Office: 410-522-7000
Fax: 410-522-7015Order Line: (800) 356-8495
Waste Mgt: (800) US-GRIDS**Peel Strength Geocomposite Testing Report**
ASTM F904*

Product Tendrain 570-2
Lot : 2
Roll Size 6.7' x 200'
Project Volusia County Landfil
Testing Lab Tenax Corp.

Geocomposite Roll #	Date Tested	SideA (lb/inch)	SideB (lb/inch)	
0200276	01/30/2002			
		3.50	1.80	
		3.13	1.78	
		2.50	2.15	
		2.60	2.00	
		2.75	1.98	
		2.90	1.94	Average
		0.41	0.15	Std. Deviation
		1.00	1.00	Specification (minimum)

*Please note that the above values are representative of the laminated area of the roll. Please allow 3% of unbonded surface on beginning and end of the roll due to manufacturing constraints. In addition to 4 inches (approximately) on each side of the roll left unbonded to allow for overlapping on the sides.

*Ply adhesion is tested by the manufacturer every 100,000 sq.ft. of production per modified ASTM F 904, with a 2 inch wide (5 longitudinal ribs) by 10 inch long strip. The geotextile bonded to the geonet is pulled apart at a peeling rate of 12 in./min., for at least 4 inches of peeling distance. The reported value is the average of the "peak" values from 5 tested samples. The 5 samples are cut evenly distributed along the roll width, and maintain a 1 foot margin from both edges of the roll.

Tested by

Antonello Capalozza

Date 02/07/2002

Checked by

Christine Caropresso

Date 02/07/2002

Thursday, February 07, 2002

Page 1 of 1

**Performance in
Plastic TechnologySM**

QUALITY CONTROL SUMMARY
Tenax Geocomposite Tendrain 570-2

Date: February 7, 2002
Lot # 2

Project: County of Volusia LF

Submitted to:
Patrick McCormick
County of Volusia Florida
Solid Waste Services
3151 East State Road 44
Deland FL 32724

386-943-7889

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Corporation

4800 East Monument Street
Baltimore, Maryland 21205

Office: 410-522-7000
Fax: 410-522-7015

Order Line: (800) 356-8495
Waste Mgt: (800) US-GRIDS

ATTN: Patrick McCormick

RE: County of Volusia LF
Tendrain 5 70-2 (200' x 6.7')
Lot # 2

February 7, 2002

Dear Patrick McCormick:

Tenax Corporation certifies the following roll numbers, 0200276, 0200277, 0200278, 0200279, 0200280, 0200281, 0200282, 0200283, 0200284, 0200285, 0200286, 0200287, 0200288, 0200289, 0200290, 0200291, 0200292, 0200293, 0200294, 0200295, 0200296, 0200297, 0200298, 0200299, 0200300, 0200301, 0200302, 0200303, 0200304, 0200305, 0200306, 0200307, 0200308, 0200309, 0200310, 0200311, 0200312, 0200313, 0200314, 0200315, 0200316, 0200317, 0200318, 0200319, 0200320, 0200321, 0200322, 0200323, 0200324, 0200325, 0200326, 0200327, 0200328, 0200329, 0200330, 0200331, 0200332, 0200333, 0200334, 0200335, 0200336, 0200337, 0200338, 0200339, 0200340, 0200341, 0200342, 0200343, 0200344, 0200345, 0200346, 0200347, 0200348, 0200349, 0200350, of Tendrain 5 70-2, consisting of lot # 2 to be shipped to the above referenced project are in accordance with the geonet properties listed in the attached Tenax specifications: Those rolls were manufactured in accordance with the Tenax Manufacturing Quality Control / Quality Assurance Plan.

This MQC submittal consists of the following sections:

Section 2 contains the geonet Manufacturing Quality Control (MQC); Section 3 entails the MQC on the geotextile used for the manufacture of these geocomposites. Section 4 describes in detail all geocomposites roll numbers that constitute lot # 2, describe there respective geotextile roll numbers and geonet roll numbers, as well as geocomposite transmissivity and peel strength.

Respectfully submitted,

Tim Bauters, Ph.D.
Quality Control Manager

**Performance in
Plastic TechnologySM**

TENDRAIN 570-2

DOUBLE-SIDED GEOCOMPOSITE

Volusia County, Tomoka Farms Road LF

The drainage geocomposite is comprised of a tri-planar geonet structure consisting of thick supporting ribs with diagonally placed top and bottom ribs and with a thermally bonded, non-woven geotextile on both sides. The product is capable of providing high Transmissivity in a soil environment under high normal loads and will have properties conforming with the values and test methods listed below:

PROPERTIES	TEST METHOD	UNIT	VALUE	QUALIFIER
GEONET CORE				
Tensile Strength - MD	ASTM D4595	lb/in (kN/m)	75 (13.0)	c, Note 1, 4
Compressive Behavior (% Retained thickness)				
@40,000 psf (short term)	ASTM D1621	%	50	c, Note 2, 4
@25,000 psf (10,000 hours)		%	65	Note 4
Mass Per Unit Area	ASTM D3776	lbs/ 1000 ft ²	160	c, Note 4
Density	ASTM D1505	g/cm ³	0.94	c, Note 4
Melt Flow Index	ASTM D1238	g/10 min.	1.0	d, note 4
Carbon Black Content	ASTM D4218	%	2.0 -3.0	a, Note 4
Thickness	ASTM D5199	mils (mm)	275 (7.0)	c, Note 3, 4
GEOTEXTILE				
Apparent Opening Size (AOS)	ASTM D4751	US Sieve (mm)	70 (0.21)	b, Note 4
Weight	ASTM D3776	oz/yd ² (g/m ²)	6 (203)	b, Note 4
Thickness	ASTM D5199	mils (mm)	65 (1.65)	b, Note 4
Water Flow Rate	ASTM D4491	gal/min/ft ² (lpm/m ²)	110 (4483)	b, Note 4
Permeability	ASTM D4491	cm/sec	0.2	b, Note 4
Permittivity	ASTM D4491	sec ⁻¹	1.3	b, Note 4
Puncture Strength	ASTM D4833	lbs (N)	90 (400)	b, Note 4
Trapezoid Tear	ASTM D4533	lbs (N)	65 (290)	b, Note 4
Grab Tensile Strength	ASTM D4632	lbs (N)	160 (712)	b, Note 4
Grab Elongation	ASTM D4632	%	50	b, Note 4
Mullen Burst	ASTM D3786	psi (kPa)	325 (2241)	b, Note 4
UV Resistance @500 Hours	ASTM D4355	%	70	b, Note 4
GEOCOMPOSITE				
Roll Width		ft (m)	6.7 (2.0)	a, Note 5
Roll Length		ft (m)	200 (61)	a, Note 5
Ply Adhesion	ASTM F904 (modified)	lb/in (N/m)	1.0 (175)	c, Note 6
Coefficient of Interface Friction w / Soil	ASTM D5321	degrees	25	Note 7
HYDRAULIC BEHAVIOR OF GEOCOMPOSITE				
Transmissivity - MD				c, Notes 8
Gradient/Load:			5,000 psf (240 kPa)	
0.02	ASTM D 4716	m ² /sec	4.0 x 10 ⁻⁴	

Qualifiers: a = Typical Value b = Minimum Average Roll Value (MARV)
c = Minimum Value d = Maximum Value

NOTES:

- Tensile properties tested by manufacturer every 50,000 square feet of product per ASTM D4595 with a specimen width of 8.0 in. and cross-head speed of 0.4 in./min
- Short term compressive behavior tested by manufacturer every 50,000 square feet of product per ASTM D1621 with a 4 in.x4 in. specimen and a constant rate of strain of 0.04 in./min.
- Thickness measured by manufacturer every 50,000 square feet of product per ASTM D5199 with a 2.22 in. diameter presser foot and 2.9 psi pressure.
- Geotextile and geonet properties listed are prior to lamination. Geotextile is tested at the industry standard frequency.
- Roll dimensions are measured at the time of manufacture.
- Ply Adhesion is tested by the manufacturer every 100,000 sf of production per modified ASTM F904, with a 2 inch wide (5 longitudinal ribs) by 10 inch long strip. The geotextile bonded to either side of the geonet is pulled apart at a peeling rate of 12 in./min., for at least 4 inches of peeling distance. The reported value for each laminated side is the average of the "peak" values from 5 tested samples. The 5 samples are cut evenly distributed along the roll width with a 1 foot margin from both edges of the roll.
- The coefficient of interface friction between the geocomposite and soil shall be determined via direct shear test. Soil shall be at approx. optimum moisture and 90% of max. compaction. Normal stress of 100, 200, 500 psf
- Geocomposite transmissivity measured by manufacturer every 100,000 square feet of product as per ASTM D4716 with testing boundary conditions as follows: steel plate / uniform sand / geocomposite / 60 mil HDPE geomembrane / steel plate, and seating period of 1 hour.



Corporation

4800 East Monument Street
Baltimore, Maryland 21205

Office: 410-522-7000

Order Line: (800) 356-8495

Fax: 410-522-7015

Waste Mgt: (800) US-GRIDS

Geonet MQC Test Results

Product TD 5
Project Volusia County Landfill
Lot # 2
Dimensions 6.7' x 200'
Testing Lab Tenax Corp.

	Geonet Roll	Date Tested	Thickness	Density	CarbonBlack	MFI	Unit Weight	Tensile Strength
			ASTM D5199 (mils)	ASTM D1505-98 (g/cm3)	ASTM D4218-96 (%)	ASTM D1238-00 (g/10min)	ASTM D3776-96 (g/m2)	ASTM D4595-94 (lb/ft)
	0200011	01/05/2002	347	0.950	2.46	0.470	1785	1750
	0200015	01/06/2002	340	0.950	2.47	0.051	1736	1701
	0200017	02/01/2002	316	0.950	2.29	0.700	1523	1608
	0200020	02/01/2002	318	0.950	2.40	0.690	1497	1512
Average			330	0.950	2.41	0.478	1635	1643
Standard Dev.			16	0.000	0.08	0.304	146	105
Specifications			275	0.940	2.00	< 1	781	900

Compression

Load (psf)	Roll #	Thickness Retained (%)	Specification (%)
40000			50
	0200011	60.70	50
	0200011	60.70	50
	0200015	62.50	50
	0200015	62.50	50
	0200017	56.00	50
	0200020	56.92	50
	Average (Specs)	59.89	50

Tested by

Antonello Capalozza

Date

02/07/2002

Checked by

Christine Caropresso

Date

02/07/2002

Thursday, February 07, 2002

Page 1 of 1

**Performance in
Plastic TechnologySM**



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/13/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114379	6.6	94	233 227	102 113	107 116	119	342	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114620	7.4	95	240 261	95 113	109 169	123	366	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114619	7.4	95	240 281	95 113	109 169	129	366	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS			Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002		
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114603	7.1	96	234	103	114	119	168	0.212	1.9 0.4
130114604	7.1	96	234	103	114	119	168	0.212	1.9 0.4
130114605	7.0	95	239	98	114	133	129	0.212	1.9 0.4
130114606	7.0	95	239	98	114	133	129	0.212	1.9 0.4
130114607	7.0	95	239	98	114	133	129	0.212	1.9 0.4
130114608	7.0	95	239	98	114	133	129	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6			Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002		
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114580	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114591	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114592	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114593	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114594	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114595	7.1	96	234 250	103 114	119 168	125	368	0.212	1.9 0.4
130114596	7.1	96	234 250	103 114	119 168	125	366	0.212	1.9 0.4
130114597	7.1	96	234 250	103 114	119 168	125	366	0.212	1.9 0.4
130114598	7.1	96	234 250	103 114	119 168	125	368	0.212	1.9 0.4
130114599	7.1	96	234 250	103 114	119 168	125	366	0.212	1.9 0.4
130114600	7.1	96	234 250	103 114	119 168	125	368	0.212	1.9 0.4
130114601	7.1	96	234 250	103 114	119 168	125	366	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114587	7.0	93	239 250	90 116	135 136	120	390	0.212	1.8 0.4
130114588	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114565	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114566	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114567	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114568	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(mm)	(sec-l) (cm/sec)				
130114555	7.2	95	255	244	90	123	155	164	118	354	0.212	1.9	0.5
130114556	7.2	95	255	244	90	123	155	164	118	354	0.212	1.9	0.5
130114557	7.2	95	265	244	90	123	155	164	118	354	0.212	1.9	0.5
130114558	7.2	95	255	244	90	123	155	164	118	354	0.212	1.9	0.5
130114559	7.2	95	255	244	90	123	155	164	118	354	0.212	1.9	0.5
130114560	7.2	95	255	244	90	123	155	164	118	354	0.212	1.9	0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608110		Roll Width: 15.0 feet		Test Date: 1/20/2002						
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability			
	(oz/yd ²)	(mils)	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4491			
			MD (lbs)	CD (%)	MD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l)	(cm/sec)	
130114550	7.2	98	231	258	93	118	134	169	138	382	1.9	0.5
130114551	7.2	98	231	258	93	118	134	169	138	382	1.9	0.5
130114552	7.2	98	231	258	93	118	134	169	138	382	1.9	0.5



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Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
	(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	(psi)	(mm)	(sec-l)	(cm/sec)			
130114538	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114539	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114540	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114541	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114542	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114543	7.2	95	223	264	97	120	122	171	133	410	0.212	1.9	0.5
130114544	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5

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Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002				
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity	Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491	
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l)	(cm/sec)
130114534	7.2	95	223 264	97 120	122 171	133	410	0.212	1.9	0.5



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Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	ASTM D 4751 ASTM D 4491
130114523	6.4	91	209 230	96 108	107 131	120	342	0.212	2.1 0.5
130114524	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114525	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114526	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114527	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114528	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114529	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114530	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114531	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5
130114532	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5

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Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100			Roll Width: 15.0 feet		Test Date: 1/21/2002		
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MID (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MID (%) CD (%)	Trap Tear Strength ASTM D 4533 MID (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (µm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114638	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114639	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114640	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114641	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114642	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114643	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NNB		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trup Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-ft) (cm/sec)
130114836	8.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4



Test Date: 1/21/2002

Product : NW6	Item Code: FBR0608100	Roll Width: 15.0 feet	Test Date: 1/21/2002						
Roll No.	Mass per Unit Area	Thickness	Grip Strength	Grip Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 1632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(cm/sec)
130114634	7.5	102	243 276	91 116	124 147	137	394	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MID (lbs) C/D (lbs)	MID (%) C/D (%)	MID (lbs) C/D (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114589	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4

Roll Test Data Summary - English Units

Test Date: 1/20/2002

Product: NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mus per Unit Area	Thickness	Graib Strength	Graib Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
		(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	ASTM D 4751 (mm)	ASTM D 4491 (sec-l) (cm/sec)
130114578	7.1	95	257 248	102 128	167 152	130	387	0.212	1.9 0.5
130114580	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114581	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114582	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114583	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114584	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.4
130114585	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114586	7.0	93	239 250	90 118	135 136	120	390	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWB			Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002		
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114569	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114570	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114571	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114572	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114573	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114574	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5



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Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trip Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114561	7.2	95	255 244	90 123	155 184	118	354	0.212	1.9 0.5
130114562	7.2	95	255 244	90 123	155 184	118	354	0.212	1.9 0.5
130114563	7.2	95	255 244	90 123	155 184	118	354	0.212	1.9 0.5
130114564	7.2	95	255 244	90 123	155 184	118	354	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd2)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(mm)	(sec-l) (cm/sec)				
130114545	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5
130114546	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5
130114547	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5
130114548	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5
130114549	7.2	98	231	258	93	118	134	169	138	382	0.212	1.9	0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114535	7.2	95	223 264	97 120	122 171	133	410	0.212	1.9 0.5
130114536	7.2	95	223 264	97 120	122 171	133	410	0.212	1.9 0.5
130114537	7.2	95	223 264	97 120	122 171	133	410	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
190114533	6.8	104	211 240	94 127	97 139	117	375	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114499	8.3	88	224 222	96 118	102 128	118	337	0.212	2.1 0.5
130114500	8.5	88	238 204	84 120	104 109	115	334	0.212	2.1 0.5
130114501	8.5	88	236 204	84 120	104 109	115	334	0.212	2.1 0.5
130114502	8.5	88	236 204	84 120	104 109	115	334	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114478	8.6	93	240 231	90 121	123 136	127	384	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trip Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (µm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114475	8.8	93	240 MD 231 CD	90 MD 121 CD	123 MD 136 CD	127	384	0.212	2.1 0.5

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GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MID (lbs) CD (lbs)	MID (%) CD (%)	MID (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114470	6.6	93	240 231	90 121	123 136	127	364	0.212	2.1 0.5
130114471	6.6	93	240 231	90 121	123 136	127	364	0.212	2.1 0.5
130114472	6.6	93	240 231	90 121	123 136	127	364	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FER0608100		Roll Width: 15.0 test		Test Date: 1/20/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
	(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(sec-l)	(cm/sec)			
130114466	8.3	91	201	223	94	111	93	125	119	354	0.212	2.1	0.5
130114467	8.3	91	201	223	94	111	83	125	119	354	0.212	2.1	0.5
130114468	8.3	91	201	223	94	111	93	125	119	354	0.212	2.1	0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FDR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	CD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114460	6.3	91	201	94	93	125	119	0.212	2.1 0.5
130114461	6.3	91	201	94	93	125	119	0.212	2.1 0.5
130114462	6.3	91	201	94	93	125	119	0.212	2.1 0.5
130114463	6.3	91	201	94	93	125	119	0.212	2.1 0.5
130114464	6.3	91	201	94	93	125	119	0.212	2.1 0.5



GSE Nonwoven Technologies

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100				Roll Width: 15.0 feet		Test Date: 2/1/2002					
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(mm)	(sec-l) (cm/sec)				
130115859	7.0	86	232	237	84	114	118	128	143	408	0.212	1.8	0.4
130115860	6.7	92	257	218	83	111	107	101	126	373	0.212	1.8	0.4
130115861	6.7	92	267	218	83	83	107	101	126	373	0.212	1.8	0.4
130115862	6.7	92	257	218	83	83	107	101	126	373	0.212	1.8	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 2/1/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130115946	8.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115947	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115948	8.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115949	8.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115850	6.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4
130115951	8.4	87	210 218	95 119	98 113	117	333	0.212	1.8 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 2/1/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(mm)	(sec-l) (cm/sec)				
130115828	7.0	96	232	237	84	114	118	128	143	408	0.212	1.8	0.4
130115829	7.0	96	232	237	84	114	118	128	143	408	0.212	1.8	0.4
130115830	7.0	96	232	237	84	114	118	128	143	408	0.212	1.8	0.4
130115831	7.0	96	232	237	84	114	118	128	143	408	0.212	1.8	0.4
130115832	7.0	96	232	237	84	114	118	128	143	408	0.212	1.8	0.4
130115833	7.0	96	232	237	84	114	118	128	143	408	0.212	1.8	0.4
130115834	6.9	87	220	233	99	121	103	110	123	373	0.212	1.8	0.4
130115835	6.9	87	220	233	99	121	103	110	123	373	0.212	1.8	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114517	6.4	91	209 230	96 108	107 131	120	342	0.212	2.1 0.5
130114518	6.4	91	209 230	96 108	107 131	120	342	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114509	6.5	88	236 204	84 120	104 109	115	334	0.212	2.1 0.5



GSE Noninvasive Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 4/10/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114088	6.7	91	243 232	93 116	103 128	118	351	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FAR0608100		Roll Width: 15.0 feet		Test Date: 11/02/002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114085	6.7	91	243 MD 232 CD	93 MD 115 CD	103 MD 128 CD	118	951	0.212	2.1 0.5



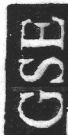
GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114091	6.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5
130114082	6.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002						
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability			
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491			
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l) (cm/sec)			
130114088	6.6	88	211	94	110	108	132	117	368	0.212	2.1	0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 11/02/02			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114082	6.6	89	211 239	94 110	108 132	117	358	0.212	2.1 0.5

130114082



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 11/02/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	ASTM D 4833 (lbs)	ASTM D 3786 (psi)	ASTM D 4751 (mm)	ASTM D 4491 (sec-l) (cm/sec)
130114075	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114076	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114077	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114078	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5
130114079	6.6	89	211 239	94 110	108 132	117	358	0.212	2.1 0.5
130114080	6.6	89	211 239	94 110	108 132	117	358	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FDR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd2)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-1) (cm/sec)
130114072	6.7	94	222 213	98 125	116 141	124	349	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FDR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130114068	6.7	94	235 245	95 107	104 125	138	358	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114084	6.7	84	235 245	95 107	104 126	138	356	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: PBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114061	6.7	94	235 245	95 107	104 125	136	356	0.212	2.1 0.5
130114062	6.7	94	235 245	95 107	104 125	136	356	0.212	2.1 0.8



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trip Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114048	8.7	96	232 250	83 110	123 131	129	364	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114045	6.7	96	232 250	83 110	123 131	129	364	0.212	1.5 0.4
130114046	6.7	96	232 250	83 110	123 131	128	364	0.212	1.5 0.4

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114036	6.8	96	237	102	113	123	374	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114034	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: 1BR0608100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114031	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4
130114032	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0603100		Roll Width: 15.0 feet		Test Date: 1/9/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114028	6.8	96	237 228	102 108	113 130	123	374	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/8/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs)	Grab Elongation ASTM D 4632 CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permeability ASTM D 4491 (sec-l) (cm/sec)
130114027	6.8	95	247	97	105	128	358	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/8/2002						
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability			
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491			
	(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l)	(cm/sec)
130113973	7.2	99	255	229	95	125	115	156	133	0.212	1.7	0.4
130113974	7.2	99	255	229	95	125	115	156	133	0.212	1.7	0.4
130113975	7.2	99	255	229	95	125	115	156	133	0.212	1.7	0.4
130113976	7.2	99	255	229	95	125	115	156	133	0.212	1.7	0.4
130113977	7.2	99	255	229	95	125	115	156	133	0.212	1.7	0.4
130113978	7.2	99	255	229	85	125	115	156	133	0.212	1.7	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/8/200			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-1) (cm/sec)
130113959	6.4	85	227 226	83 107	109 122	124	339	0.212	1.7 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/9/200			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114047	6.7	96	232 250	93 110	123 131	129	364	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114059	6.7	94	235 245	95 107	104 125	136	356	0.212	2.1 0.5
130114060	6.7	94	235 245	95 107	104 125	136	356	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114096	6.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5
130114097	6.7	91	243 232	93 115	103 128	118	351	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/10/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114099	6.9	94	248 233	86 112	111 125	129	374	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100			Roll Width: 15.0 feet			Test Date: 1/12/20					
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
ASTM D 5261	ASTM D 5199	(mils)	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd2)			MD (lbs)	CD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l) (cm/sec)				
130114255	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114256	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114257	7.9	115	266	279	94	132	158	180	152	350	0.212	1.5	0.4
130114258	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114259	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114260	7.9	115	266	279	94	132	158	180	152	389	0.212	1.5	0.4
130114261	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114262	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114263	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114264	7.9	115	266	279	94	132	197	229	152	389	0.212	1.5	0.4
130114265	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114266	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114267	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114268	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114269	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114270	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114271	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114272	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114273	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114274	7.2	109	239	233	97	127	154	148	119	350	0.212	1.5	0.4
130114275	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114276	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114277	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114278	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4
130114279	7.5	108	235	260	117	123	142	142	124	348	0.212	1.5	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114280	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114281	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114282	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114283	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114284	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261 (oz/yd ²)	ASTM D 5199 (mils)	ASTM D 4632 MD (lbs) CD (lbs)	ASTM D 4632 MD (%) CD (%)	ASTM D 4533 MD (lbs) CD (lbs)	ASTM D 4833 (lbs)	ASTM D 3786 (psi)	ASTM D 4751 (mm)	ASTM D 4491 (cm/sec)
130114289	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114290	7.5	108	235 260	117 123	142 142	124	348	0.212	1.5 0.4
130114291	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4
130114292	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4
130114293	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4
130114294	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114297	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4
130114298	7.2	111	222 232	107 128	152 128	123	368	0.212	1.5 0.4



Test Date: 1/12/20

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
	(oz/yd2)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(sec-l)				
							(psi)	(mm)	(cm/sec)				
130114301	6.8	81	195	200	65	86	135	125	111	355	0.212	1.5	0.4
130114302	6.8	81	195	200	65	86	135	125	111	355	0.212	1.5	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20						
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability			
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491			
	(oz/yd2)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-I)	(cm/sec)
130114308	6.8	81	195	200	65	86	135	125	111	355	0.212	1.5 0.4
130114309	6.8	81	195	200	65	86	135	125	111	355	0.212	1.5 0.4
130114310	6.8	81	195	200	65	86	135	125	111	355	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114305	6.8	81	195 200	65 86	135 125	111	355	0.212	1.5 0.4
130114306	6.8	81	195 200	85 86	135 125	111	355	0.212	1.5 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114312	7.4	105	232 255	112 118	117 132	131	359	0.212	1.5 0.4

TENAX CORPORATION

GEOCOMPOSITE REPORT

PRODUCT :

Tendrain 570-2

JOB:

County of Volusia LF

LOT #

2

DATE:

02/07/2001

COMPOSITE #	NET #	TEXTILE #	TEXTILE #	Roll Length	# of rolls in lot
200276	0200012	130114541	130114596	200	1
200277	0200012	130114541	130114601	151	2
200278	0200013	130114485	130114484	200	3
200279	0200013	130114485	130114484	200	4
200280	0200013	130114485	130114484	200	5
200281	0200013	130114485	130114484	200	6
200282	0200013	130114485	130114484	200	7
200283	0200013	130114479	130114484	200	8
200284	0200013	130114479	130114489	200	9
200285	0200013	130114479	130114489	200	10
200286	0200013	130114479	130114489	200	11
200287	0200014	130114479	130114489	200	12
200288	0200014	130114315	130114489	200	13
200289	0200014	130114315	130114487	200	14
200290	0200014	130114315	130114487	200	15
200291	0200014	130114315	130114487	200	16
200292	0200014	130114315	130114487	200	17
200293	0200014	130114486	130114487	200	18
200294	0200014	130114486	130114487	200	19
200295	0200014	130114486	130114487	175	20
200296	0200015	130114486	130114490	200	21
200297	0200015	130114486	130114490	200	22
200298	0200015	130114486	130114490	200	23
200299	0200015	130114319	130114490	200	24
200300	0200015	130114319	130114508	200	25
200301	0200015	130114319	130114508	200	26
200302	0200015	130114319	130114508	200	27
200303	0200015	130114319	130114508	200	28
200304	0200015	130114319	130114508	200	29
200305	0200016	130114510	130114503	200	30
200306	0200016	130114510	130114503	200	31
200307	0200016	130114510	130114503	200	32
200308	0200016	130114510	130114503	200	33
200309	0200016	130114510	130114503	200	34
200310	0200016	130114100	130114506	200	35
200311	0200016	130114100	130114506	200	36
200312	0200016	130114100	130114506	200	37
200313	0200016	130114100	130114506	200	38
200314	0200017	130114316	130114306	200	39
200315	0200017	130114316	130114318	200	40
200316	0200017	130114316	130114318	200	41
200317	0200017	130114316	130114318	200	42

TENAX CORPORATION

GEOCOMPOSITE REPORT

PRODUCT :	Tendrain 570-2
JOB:	County of Volusia LF
LOT #	2
DATE:	02/07/2001

COMPOSITE #	NET #	TEXTILE #	TEXTILE #	Roll Length	# of rolls in lot
200318	0200017	130114316	130114318	200	43
200319	0200017	130114515	130114318	200	44
200320	0200017	130114515	130114317	200	45
200321	0200017	130114515	130114317	200	46
200322	0200017	130114515	130114317	200	47
200323	0200018	130114515	130114317	200	48
200324	0200018	130114514	130114317	200	49
200325	0200018	130114514	130114313	200	50
200326	0200018	130114514	130114313	200	51
200327	0200018	130114514	130114313	200	52
200328	0200018	130114514	130114313	200	53
200329	0200018	130114512	130114313	200	54
200330	0200018	130114512	130114483	200	55
200331	0200018	130114512	130114483	200	56
200332	0200019	130114512	130114483	200	57
200333	0200019	130114512	130114483	200	58
200334	0200019	130114038	130114483	200	59
200335	0200019	130114038	130114035	200	60
200336	0200019	130114038	130114035	200	61
200337	0200019	130114038	130114035	200	62
200338	0200019	130114038	130114035	200	63
200339	0200019	130114038	130114035	200	64
200340	0200019	130114311	130114035	200	65
200341	0200019	130114311	130114516	200	66
200342	0200020	130114311	130114516	200	67
200343	0200020	130114311	130114516	200	68
200344	0200020	130114311	130114516	200	69
200345	0200020	130114051	130114028	200	70
200346	0200020	130114051	130114028	200	71
200347	0200020	130114051	130114028	200	72
200348	0200020	130114051	130114028	200	73
200349	0200020	130114051	130114028	200	74
200350	0200020	130114513	130114028	200	75



Corporation

4800 East Monument Street
Baltimore, Maryland 21205Office: 410-522-7000
Fax: 410-522-7015Order Line: (800) 356-8495
Waste Mgt: (800) US-GRIDS**Transmissivity Test Data**
ASTM D 4716-95

Product Tendrain 570-2
Lot # 2
Roll Size 6.7' x 200'
Project Volusia County Landfil
Specimen Size 12" x 14"
Testing Lab Tenax

TEST CONFIGURATION

Plate
Sand
Tendrain 570-2
Geomembrane
Plate

Geocomposite Roll	Testing Date	Load (psf)	Seating Period (hrs)	Gradient	Transmissivity (m2/sec)	Specification (m2/sec)
0200276	02/07/2002	5000	1	0.02	1.56E-02	4.00E-04

Tested by

Antonello Capalozza

Date 02/07/2002

Checked by

Christine Caropresso

Date 02/07/2002



Corporation

4800 East Monument Street
Baltimore, Maryland 21205

Office: 410-522-7000

Order Line: (800) 356-8495

Fax: 410-522-7015

Waste Mgt: (800) US-GRIDS

Peel Strength Geocomposite Testing Report
ASTM F904*

Product Tendrain 570-2
Lot : 2
Roll Size 6.7' x 200'
Project Volusia County Landfil
Testing Lab Tenax Corp.

Geocomposite Roll #	Date Tested	SideA (lb/inch)	SideB (lb/inch)	
0200276	01/30/2002	3.50	1.80	
		3.13	1.78	
		2.50	2.15	
		2.60	2.00	
		2.75	1.98	
		2.90	1.94	Average
		0.41	0.15	Std. Deviation
		1.00	1.00	Specification (minimum)

*Please note that the above values are representative of the laminated area of the roll. Please allow 3% of unbonded surface on beginning and end of the roll due to manufacturing constraints. In addition to 4 inches (approximately) on each side of the roll left unbonded to allow for overlapping on the sides.

*Ply adhesion is tested by the manufacturer every 100,000 sq.ft. of production per modified ASTM F 904, with a 2 inch wide (5 longitudinal ribs) by 10 inch long strip. The geotextile bonded to the geonet is pulled apart at a peeling rate of 12 in./min., for at least 4 inches of peeling distance. The reported value is the average of the "peak" values from 5 tested samples. The 5 samples are cut evenly distributed along the roll width, and maintain a 1 foot margin from both edges of the roll.

Tested by

Antonello Capalozza

Date 02/07/2002

Checked by

Christine Caropresso

Date 02/07/2002

Thursday, February 07, 2002

Page 1 of 1

**Performance in
Plastic TechnologySM**

QUALITY CONTROL SUMMARY
Tenax Geocomposite Tendrain 570-2

Date: February 14, 2002
Lot # 3

Project: County of Volusia LF

Submitted to:
Patrick McCormick
County of Volusia Florida
Solid Waste Services
3151 East State Road 44
Deland FL 32724

386-943-7889

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Corporation

4800 East Monument Street
Baltimore, Maryland 21205

Office: 410-522-7000
Fax: 410-522-7015

Order Line: (800) 356-8495
Waste Mgt: (800) US-GRIDS

ATTN: Patrick McCormick

RE: County of Volusia LF
Tendrain 5 70-2 (200' x 6.7')
Lot # 3

February 7, 2002

Dear Patrick McCormick:

Tenax Corporation certifies the following roll numbers, 0200351, 0200352, 0200353, 0200354, 0200355, 0200356, 0200357, 0200358, 0200359, 0200360, 0200361, 0200362, 0200363, 0200364, 0200365, 0200366, 0200367, 0200368, 0200369, 0200370, 0200371, 0200372, 0200373, 0200374, 0200375, 0200376, 0200377, 0200378, 0200379, 0200380, 0200381, 0200382, 0200383, 0200384, 0200385, 0200386, 0200387, 0200388, 0200389, 0200390, 0200391, 0200392, 0200393, 0200394, 0200395, 0200396, 0200397, 0200398, 0200399, 0200400, 0200401, 0200402, of Tendrain 5 70-2, consisting of lot # 3 to be shipped to the above referenced project are in accordance with the geonet properties listed in the attached Tenax specifications:

Those rolls were manufactured in accordance with the Tenax Manufacturing Quality Control / Quality Assurance Plan.

This MQC submittal consists of the following sections:

Section 2 contains the geonet Manufacturing Quality Control (MQC); Section 3 entails the MQC on the geotextile used for the manufacture of these geocomposites. Section 4 describes in detail all geocomposites roll numbers that constitute lot # 3, describe there respective geotextile roll numbers and geonet roll numbers, as well as geocomposite transmissivity and peel strength.

Respectfully submitted,

Tim Bauters, Ph.D.
Quality Control Manager

TENDRAIN 570-2

DOUBLE-SIDED GEOCOMPOSITE

Volusia County, Tomoka Farms Road LF

The drainage geocomposite is comprised of a tri-planar geonet structure consisting of thick supporting ribs with diagonally placed top and bottom ribs and with a thermally bonded, non-woven geotextile on both sides. The product is capable of providing high Transmissivity in a soil environment under high normal loads and will have properties conforming with the values and test methods listed below:

PROPERTIES	TEST METHOD	UNIT	VALUE	QUALIFIER
GEONET CORE				
Tensile Strength - MD	ASTM D4595	lb/in (kN/m)	75 (13.0)	c, Note 1, 4
Compressive Behavior (% Retained thickness)				
@40,000 psf (short term)	ASTM D1621	%	50	c, Note 2, 4
@25,000 psf (10,000 hours)		%	65	Note 4
Mass Per Unit Area	ASTM D3776	lbs/ 1000 ft ²	160	c, Note 4
Density	ASTM D1505	g/cm ³	0.94	c, Note 4
Melt Flow Index	ASTM D1238	g/10 min.	1.0	d, note 4
Carbon Black Content	ASTM D4218	%	2.0 -3.0	a, Note 4
Thickness	ASTM D5199	mils (mm)	275 (7.0)	c, Note 3, 4
GEOTEXTILE				
Apparent Opening Size (AOS)	ASTM D4751	US Sieve (mm)	70 (0.21)	b, Note 4
Weight	ASTM D3776	oz/yd ² (g/m ²)	6 (203)	b, Note 4
Thickness	ASTM D5199	mils (mm)	65 (1.65)	b, Note 4
Water Flow Rate	ASTM D4491	gal/min/ft ² (lpm/m ²)	110 (4483)	b, Note 4
Permeability	ASTM D4491	cm/sec	0.2	b, Note 4
Permittivity	ASTM D4491	sec ⁻¹	1.3	b, Note 4
Puncture Strength	ASTM D4833	lbs (N)	90 (400)	b, Note 4
Trapezoid Tear	ASTM D4533	lbs (N)	65 (290)	b, Note 4
Grab Tensile Strength	ASTM D4632	lbs (N)	160 (712)	b, Note 4
Grab Elongation	ASTM D4632	%	50	b, Note 4
Mullen Burst	ASTM D3786	psi (kPa)	325 (2241)	b, Note 4
UV Resistance @500 Hours	ASTM D4355	%	70	b, Note 4
GEOCOMPOSITE				
Roll Width		ft (m)	6.7 (2.0)	a, Note 5
Roll Length		ft (m)	200 (61)	a, Note 5
Ply Adhesion	ASTM F904 (modified)	lb/in (N/m)	1.0 (175)	c, Note 6
Coefficient of Interface Friction w / Soil	ASTM D5321	degrees	25	Note 7
HYDRAULIC BEHAVIOR OF GEOCOMPOSITE				
Transmissivity - MD				c, Notes 8
Gradient/Load:			5,000 psf (240 kPa)	
0.02	ASTM D 4716	m ² /sec	4.0 x 10 ⁻⁴	

Qualifiers: a = Typical Value b = Minimum Average Roll Value (MARV)
c = Minimum Value d = Maximum Value

NOTES:

- Tensile properties tested by manufacturer every 50,000 square feet of product per ASTM D4595 with a specimen width of 8.0 in. and cross-head speed of 0.4 in/min
- Short term compressive behavior tested by manufacturer every 50,000 square feet of product per ASTM D1621 with a 4 in.x4 in. specimen and a constant rate of strain of 0.04 in./min.
- Thickness measured by manufacturer every 50,000 square feet of product per ASTM D5199 with a 2.22 in. diameter presser foot and 2.9 psi pressure.
- Geotextile and geonet properties listed are prior to lamination. Geotextile is tested at the industry standard frequency.
- Roll dimensions are measured at the time of manufacture.
- Ply Adhesion is tested by the manufacturer every 100,000 sf of production per modified ASTM F904, with a 2 inch wide (5 longitudinal ribs) by 10 inch long strip. The geotextile bonded to either side of the geonet is pulled apart at a peeling rate of 12 in/min., for at least 4 inches of peeling distance. The reported value for each laminated side is the average of the "peak" values from 5 tested samples. The 5 samples are cut evenly distributed along the roll width with a 1 foot margin from both edges of the roll.
- The coefficient of interface friction between the geocomposite and soil shall be determined via direct shear test. Soil shall be at approx. optimum moisture and 90% of max. compaction. Normal stress of 100, 200, 500 psf
- Geocomposite transmissivity measured by manufacturer every 100,000 square feet of product as per ASTM D4716 with testing boundary conditions as follows: steel plate / uniform sand / geocomposite / 60 mil HDPE geomembrane / steel plate, and seating period of 1 hour.



Corporation

**4800 East Monument Street
Baltimore, Maryland 21205**

Office: (410) 522-7000

Order Line: (800) 356-8495

Fax: (410) 522-7015

Waste Mgt: (800) US-GRIDS

Web Site: www.tenaxus.com**Geonet MQC Test Results**

Product TD5 (200')
Project Volusia County Landfill
Lot # 3
Dimensions 6.7' x 200'
Testing Lab Tenax

Geonet Roll	Date Tested	Thickness ASTM D5199 (mils)	Density ASTM D1505-98 (g/cm3)	CarbonBlack ASTM D4218-96 (%)	MFI ASTM D1238-00 (g/10min)	Unit Weight ASTM D3776-96 (g/m2)	Tensile Strength ASTM D4595-94 (lb/ft)
0200221	01/21/2002	336	0.948	2.54	0.500	1706	1872
0200226	01/21/2002	326	0.950	2.35	0.500	1679	1824
0200255	01/21/2002	323	0.948	2.60	0.510	1636	1920
0200256	01/22/2002	329	0.951	2.38	0.470	1782	1728
0200296	01/23/2002	330	0.952	2.47	0.500	1725	1824
0200332	01/25/2002	327	0.950	2.44	0.100	1686	1872
0200372	01/28/2002	324	0.951	2.39	0.700	1713	1680
Sample		328	0.950	2.45	0.469	1704	1817
Standard Dev.		4	0.002	0.09	0.180	45	85
Specifications		275	0.940	2.00	< 1	781	900

Compression

Load (psf)	Roll #	Thickness Retained (%)	Specification (%)
40000			50
	0200221	58.00	50
	0200226	56.00	50
	0200255	56.00	50
	0200256	57.00	50
	0200296	59.00	50
	0200332	57.00	50
	0200372	58.00	50
Average (Specs)		57.29	50

Tested by

Antonello Capalozza

Date

02/14/2002

Checked by

Tim Bauters, Ph.D.

Date

02/14/2002

Thursday, February 14, 2002

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TENAX
 Phone: (410) 522-7000 Order Line: (800) 356-8495
 Fax: (410) 522-7015 Waste Mgt: (800) US-GRIDS
4800 East Monument Street
Baltimore, Maryland 21205
 Office: (410) 522-7000 Order Line: (800) 356-8495
 Fax: (410) 522-7015 Waste Mgt: (800) US-GRIDS
 Web Site: www.tenaxus.com

Geonet MQC Test Results

Product **TD 5**
 Project **Volusia County Landfill**
 Lot # **3**
 Dimensions **6.7' x 200'**
 Testing Lab **Tenax Corp.**

Geonet Roll	Date Tested	Thickness ASTM D5199 (mils)	Density ASTM D1505-98 (g/cm3)	CarbonBlack ASTM D4218-96 (%)	MFI ASTM D1238-00 (g/10min)	Unit Weight ASTM D3776-96 (g/m2)	Tensile Strength ASTM D4595-94 (lb/ft)
0102505	12/16/2001	328	0.953	2.38	0.530	1688	1600
0102559	12/21/2001	324	0.947	2.50	0.500	1773	2160
0102592	12/22/2001	327	0.950	2.48	0.400	1809	1968
Average		326	0.950	2.45	0.477	1757	1909
Standard Dev.		2	0.003	0.06	0.068	62	285
Specifications		275	0.940	2.00	< 1	781	900

Compression

Load (psf)	Roll #	Thickness Retained (%)	Specification (%)
40000			50
	0102505	58.00	50
	0102559	61.00	50
	0102592	64.00	50
	Average (Specs)	61.00	50

Tested by

David Mitchell

Date

02/14/2002

Checked by

Christine Caropresso

Date

02/14/2002

Thursday, February 14, 2002

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**Performance in
Plastic TechnologySM**



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWB		Item Code: F9R0608100		Roll Width: 15.0 feet		Test Date: 1/13/20			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Minlen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permeability ASTM D 4491 (sec-l) (cm/sec)
130114380	6.8	94	233 227	102 113	107 116	119	342	0.212	2.1 0.5
130114381	6.6	98	232 237	91 113	113 100	134	361	0.212	1.8 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/13/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114377	8.6	94	233 227	102 113	107 118	119	342	0.212	2.1 0.5
130114378	8.6	94	233 227	102 113	107 116	119	342	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWE		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/13/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(inits)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114372	6.6	94	233 227	102 113	107 116	119	342	0.212	2.1 0.5
130114378	6.6	94	233 227	102 113	107 116	119	342	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR060&100		Roll Width: 15.0 feet		Test Date: 1/13/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) C/D (lbs)	MD (%) C/D (%)	MD (lbs) C/D (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114369	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6			Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/13/20		
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permeability Permeability ASTM D 4491 (sec-l) (cm/sec)
130114352	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114353	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114354	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114355	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114356	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114357	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114358	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114359	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114360	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1 0.5
130114361	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5
130114362	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5
130114363	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5
130114364	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5
130114365	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5
130114366	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5
130114367	6.4	89	228 218	92 115	127 123	121	364	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS			Item Code: FBR0608100			Roll Width: 15.0 feet			Test Date: 1/13/20		
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)		
130114327	6.6	93	221 255	93 118	93 135	122	350	0.212	2.1	0.5	
130114328	6.6	93	221 255	93 118	93 135	122	350	0.212	2.1	0.5	
130114329	6.6	93	221 255	93 118	93 135	122	350	0.212	2.1	0.5	
130114330	6.6	93	221 255	93 118	93 135	122	350	0.212	2.1	0.5	
130114331	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114332	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114333	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114334	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114335	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114336	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114337	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114338	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114339	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114340	6.5	90	237 227	92 125	115 130	122	335	0.212	2.1	0.5	
130114341	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114342	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114343	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114344	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114345	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114346	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114347	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114348	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114349	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114350	6.8	88	217 217	89 119	105 115	127	361	0.212	2.1	0.5	
130114351	6.6	91	215 241	94 114	104 137	125	374	0.212	2.1	0.5	



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/13/20							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Perminivity Permeability				
ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd ²)	(mil)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l)	(cm/sec)		
130114321	6.6	93	221	255	93	118	93	135	122	350	0.212	1.5	0.4
130114322	6.6	93	221	255	93	118	93	135	122	350	0.212	2.1	0.5
130114323	6.6	93	221	255	93	118	93	135	122	350	0.212	2.1	0.5
130114324	6.6	93	221	255	93	118	93	135	122	350	0.212	2.1	0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0618100		Roll Width: 15.0 feet		Test Date: 1/12/20			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114314	7.4	105	232 255	112 118	117 132	131	369	0.212	1.6 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/12/20							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permeability				
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l) (cm/sec)				
130114307	6.8	81	195	200	65	86	135	125	111	355	0.212	1.5	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NW6	Item Code: FBR0608100	Roll Width: 15.0 feet	Test Date: 1/21/2002						
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114638	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114639	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114640	6.9	94	227 257	105 116	144 167	118	368	0.212	1.9 0.4
130114641	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114642	6.9	94	227 257	105 116	144 167	119	358	0.212	1.9 0.4
130114643	6.9	94	227 257	105 116	144 167	119	368	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trip Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114836	8.9	94	227 257	106 116	144 167	119	358	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	AID (lbs) CD (lbs)	AID (%) CD (%)	AID (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114834	7.5	102	243 278	91 116	124 147	137	394	0.212	1.9 0.4



Roll Test Data Summary - English Units

Test Date: 1/21/2002

Roll Width: 15.0 feet

Item Code: FBR0608100

Product: NWB

Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
			ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4633	ASTM D 3786	ASTM D 4751	ASTM D 4491
		(mils)	MD (lbs)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-l)
			CD (lbs)	CD (%)	CD (lbs)				(cm/sec)
30114589	7.0	93	239	90	135	120	390	0.212	1.9
			250	116	136				0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NWS		Item Code: FBR0608100		Roll Width: 15.0' in		Test Date: 1/20/2002			
Roll No.	Mas per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trip Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114578	7.1	95	257 248	102 128	167 152	130	387	0.212	1.9 0.5
130114580	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114581	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114582	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114583	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114584	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114585	7.0	93	239 250	90 116	135 136	120	380	0.212	1.9 0.4
130114586	7.0	93	239 250	90 118	135 138	120	390	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
(oz/yd ²)	(mils)	MD (lbs)	CD (%)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-ft) (cm/sec)
130114569	7.1	94	249	240	145	154	351	0.212	1.9
									0.5
130114570	7.1	94	249	240	145	154	361	0.212	1.9
									0.5
130114571	7.1	94	249	240	145	154	351	0.212	1.9
									0.5
130114572	7.1	94	249	240	145	154	361	0.212	1.9
									0.5
130114573	7.1	94	249	240	145	154	351	0.212	1.9
									0.5
130114574	7.1	94	249	240	145	154	361	0.212	1.9
									0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114475	6.8	93	240 231	90 121	123 136	127	364	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	CD (%)	MD (lbs)	CD (lbs)	(psi)	(mm)	(sec-l)
130114470	6.6	93	240	90	123	136	364	0.212	2.1 0.5
130114471	6.6	93	240	90	123	136	364	0.212	2.1 0.5
130114472	6.6	93	240	90	123	136	364	0.212	2.1 0.5



Roll Test Data Summary - English Units

Product : NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trip Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Pennnebilitiv
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114466	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114467	8.3	91	201 223	94 111	83 125	119	354	0.212	2.1 0.5
130114468	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NWS		Item Code: FDR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114460	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114461	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114462	8.3	91	201 223	94 111	93 125	118	354	0.212	2.1 0.5
130114463	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5
130114464	8.3	91	201 223	94 111	93 125	119	354	0.212	2.1 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Uni's

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002							
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability				
ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491				
(oz/yd ²)	(mils)	MD (lbs)	CD (lbs)	MD (%)	CD (%)	MD (lbs)	CD (lbs)	(mm)	(sec-l) (cm/sec)				
130114638	6.9	94	227	257	105	116	144	167	119	358	0.212	1.9	0.4
130114639	6.9	94	227	257	105	116	144	167	119	358	0.212	1.9	0.4
130114640	6.9	94	227	257	105	116	144	167	119	358	0.212	1.9	0.4
130114641	6.9	94	227	257	105	116	144	167	119	358	0.212	1.9	0.4
130114642	6.9	94	227	257	105	116	144	167	119	358	0.212	1.9	0.4
130114643	6.9	94	227	257	105	116	144	167	119	358	0.212	1.9	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NNB		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114836	8.9	94	227 257	106 116	144 167	119	368	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0603100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Tripp Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114634	7.5	102	243	91	124	147	137	394	1.9
			278	116				0.212	0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/21/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs)	MD (%)	MD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130114589	7.0	93	239	90	135	120	390	0.212	1.9 0.4

Roll Test Data Summary - English Units

Test Date: 1/20/2002

Product : NWS		Item Code: FER0608100			Roll Width: 15.0 feet		Test Date: 1/20/2002		
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trip Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114579	7.1	95	257 248	102 128	167 152	130	387	0.212	1.9 0.5
130114580	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114581	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114582	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114583	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114584	7.1	95	257 248	102 129	167 152	130	387	0.212	1.9 0.5
130114585	7.0	93	239 250	90 116	135 136	120	390	0.212	1.9 0.4
130114586	7.0	93	239 250	90 118	135 136	120	390	0.212	1.9 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product: NW8		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/20/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	(Inch Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permittivity Permeability ASTM D 4491 (sec-l) (cm/sec)
130114569	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114570	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114571	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114572	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114573	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5
130114574	7.1	94	249 240	94 120	145 154	117	351	0.212	1.9 0.5



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/31/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130115778	7.0	98	250 247	87 118	112 122	126	364	0.212	1.7 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/31/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cu/sec)
130115776	7.0	98	250 247	97 116	112 122	126	364	0.212	1.7 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/31/2002			
Roll No.	Mass per Unit Area ASTM D 5261	Thickness ASTM D 5199	Grab Strength ASTM D 4632	Grab Elongation ASTM D 4632	Trap Tear Strength ASTM D 4533	Puncture Strength ASTM D 4833	Mullen Burst Strength ASTM D 3786	Apparent Opening Size ASTM D 4751	Permittivity Permeability ASTM D 4491
	(oz/yd ²)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130115761	6.9	86	232 223	87 127	142 160	115	351	0.150	1.6 0.4
130115762	6.9	86	232 223	87 127	142 150	116	351	0.150	1.6 0.4
130115763	6.9	86	232 223	87 127	142 150	116	351	0.150	1.6 0.4
130115764	6.6	88	239 220	87 124	135 151	118	335	0.212	1.7 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/31/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd ²)	(mil)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130115768	6.9	86	232 223	87 127	142 160	115	361	0.150	1.8 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NWS		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/31/2002			
Roll No.	Mass per Unit Area ASTM D 5261 (oz/yd ²)	Thickness ASTM D 5199 (mils)	Grab Strength ASTM D 4632 MD (lbs) CD (lbs)	Grab Elongation ASTM D 4632 MD (%) CD (%)	Trap Tear Strength ASTM D 4533 MD (lbs) CD (lbs)	Puncture Strength ASTM D 4833 (lbs)	Mullen Burst Strength ASTM D 3786 (psi)	Apparent Opening Size ASTM D 4751 (mm)	Permeability ASTM D 4491 (sec-ft) (cm/sec)
130115757	6.9	86	232 223	87 127	142 150	116	351	0.150	1.6 0.4



GSE Nonwoven Technology

Roll Test Data Summary - English Units

Product : NW6		Item Code: FBR0608100		Roll Width: 15.0 feet		Test Date: 1/31/2002			
Roll No.	Mass per Unit Area	Thickness	Grab Strength	Grab Elongation	Trap Tear Strength	Puncture Strength	Mullen Burst Strength	Apparent Opening Size	Permittivity Permeability
	ASTM D 5261	ASTM D 5199	ASTM D 4632	ASTM D 4632	ASTM D 4533	ASTM D 4833	ASTM D 3786	ASTM D 4751	ASTM D 4491
	(oz/yd2)	(mils)	MD (lbs) CD (lbs)	MD (%) CD (%)	MD (lbs) CD (lbs)	(lbs)	(psi)	(mm)	(sec-l) (cm/sec)
130115755	8.9	86	232 223	87 127	142 150	115	351	0.150	1.6 0.4

TENAX CORPORATION

GEOCOMPOSITE / TRACEABILITY REPORT

PRODUCT :

JOB:

Lot #

DATE:

Tendrain 570-2
Volusia County
3
02/04/2002

NET TYPE:

TEXTILE 1:

TEXTILE 2:

TD 5
GSE 6oz.
GSE 6oz.

TEXTILE #	NET #	TEXTILE #	COMPOSITE #	Roll Length
130114584	0102505	130114582	0200351	200
130114584	0102507	130114582	0200352	200
130114476	0102508	130114582	0200353	150
130114476	0102509	130114582	0200354	200
130114584	0102510	130114582	0200355	200
130114584	0102511	130114572	0200356	200
130114545	0102512	130114572	0200357	200
130114545	0102513	130114572	0200358	200
130114584	0102514	130114572	0200359	200
130114584	0102516	130114572	0200360	200
130114365	0102517	130114585	0200361	200
130114365	0102518	130114585	0200362	200
130114365	0102519	130114585	0200363	200
130114478	0102520	130114585	0200364	200
130114478	0102521	130114585	0200365	200
130114478	0102522	130114586	0200366	190
130114563	0102523	130114586	0200367	167
130114563	0102524	130114586	0200368	200
130114563	0102544	130114586	0200369	200
130114563	0102552	130114573	0200370	200
130114476	0102553	130114573	0200371	200
130114545	0102555	130114573	0200372	200
130114563	0102565	130114573	0200373	200
130114563	0102566	130114573	0200374	200
130114476	0102572	130114573	0200375	200
130114476	0102573	130114577	0200376	200
130114545	0102574	130114547	0200377	200
130114545	0102575	130114547	0200378	200
130114478	0102576	130114547	0200379	200
130114478	0102584	130114547	0200380	180
130114365	0200207	130114547	0200381	200
130114365	0200217	130114546	0200382	200
130114562	0200221	130114548	0200383	200
130114562	0200225	130114548	0200384	200
130114562	0200229	130114548	0200385	200
130114546	0200248	130114548	0200386	195
130114562	0200280	130114548	0200387	200
130115840	0200281	130114472	0200388	200
130114546	0200282	130114472	0200389	200
130114546	0200283	130114472	0200390	200

TENAX CORPORATION

GEOCOMPOSITE / TRACEABILITY REPORT

PRODUCT :

JOB:

Lot #

DATE:

Tendrain 570-2
Volusia County
3
02/04/2002

NET TYPE:

TEXTILE 1:

TEXTILE 2:

TD 5
GSE 6oz.
GSE 6oz.

130114546	0200284	130114472	0200391	200
130114546	0200285	130114472	0200392	200
130115840	0200286	130114340	0200393	200
130115840	0200289	130114340	0200394	200
130115840	0200295	130114340	0200395	200
130114342	0200299	130114340	0200396	200
130115840	0200300	130115839	0200397	200
130115840	0200301	130115839	0200398	200
130115840	0200306	130115839	0200399	200
130115840	0200327	130115839	0200400	200
130114342	0200337	130115839	0200401	150
130114342	0200372	130114345	0200402	200



Corporation

4800 East Monument Street
Baltimore, Maryland 21205

Office: (410) 522-7000

Order Line: (800) 356-8495

Fax: (410) 522-7015

Waste Mgt: (800) US-GRIDS

Web Site: www.tenaxus.com

Transmissivity Test Data

ASTM D 4716-95

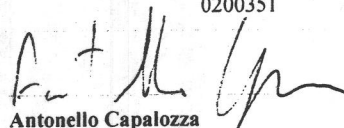
Product Tendrain 570-2
Lot # 3
Roll Size 6.7' x 200'
Project Volusia County Landfil
Specimen Size 12" x 14"
Testing Lab Tenax Corp.

TEST CONFIGURATION

Plate
Sand
Tendrain 570-2
Geomembrane
Plate

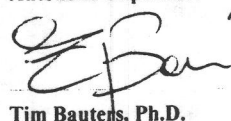
Geocomposite Roll	Testing Date	Load (psf)	Seating Period (hrs)	Gradient	Transmissivity (m2/sec)	Specification (m2/sec)
0200351	02/14/2002	5000	1	0.02	1.56E-02	4.00E-04

Tested by


Antonello Capalozza

Date 02/14/2002

Checked by


Tim Bauters, Ph.D.

Date 02/14/2002



Corporation

**4800 East Monument Street
Baltimore, Maryland 21205**

Office: (410) 522-7000

Order Line: (800) 356-8495

Fax: (410) 522-7015

Waste Mgt: (800) US-GRIDS

Web Site: www.tenaxus.com**Peel Strength Geocomposite Testing Report**
ASTM F904*

Product Tendrain 570-2
Lot : 3
Roll Size 6.7' x 200'
Project Volusia County Landfil
Testing Lab Tenax Corp.

Geocomposite Roll #	Date Tested	SideA (lb/inch)	SideB (lb/inch)	
0200351	02/14/2002	1.06	1.67	
		1.65	1.87	
		1.45	1.78	
		1.05	1.75	
		1.25	1.63	
		1.29	1.74	Average
		0.26	0.09	Std. Deviation
		1.00	1.00	Specification (minimum)

Please note that the above values are representative of the laminated area of the roll. Please allow 3% of unbonded surface on beginning and end of the roll due to manufacturing constraints. In addition to 4 inches (approximately) on each side of the roll left unbonded to allow for overlapping on the sides.

*Ply adhesion is tested by the manufacturer every 100,000 sq.ft. of production per modified ASTM F 904, with a 2 inch wide (5 longitudinal ribs) by 10 inch long strip. The geotextile bonded to the geonet is pulled apart at a peeling rate of 12 in./min., for at least 4 inches of peeling distance. The reported value is the average of the "peak" values from 5 tested samples. The 5 samples are cut evenly distributed along the roll width, and maintain a 1 foot margin from both edges of the roll.

Tested by

Guy Rauch

Date 02/14/2002

Checked by

Antonello Capalozza

Date 02/14/2002

QUALITY CONTROL SUMMARY

TNT 507076

Prepared for : County of Volusia Date : November 13, 1997

BOL#5749

STOCK

Project: County of Volusia Florida

**Submitted to: Brenda Thompson
County of Volusia, Florida
3151 East State Road 44
Deland, Fl 32724**

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TENAX[®]

Corporation

4800 East Monument Street
Baltimore, Maryland 21205Office: 410-522-7000
Fax: 410-522-7015Order Line: (800) 356-8495
Waste Mgt: (800) US-GRIDS

November 13, 1997

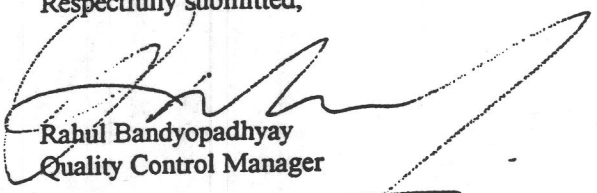
Ms. Brenda Thompson
County of Volusia, Florida
21215 East State Road
Deland, Fla 32724RE: County of Volusia Project
P.O. #TRFL9710002

Dear Ms. Thompson:

Tenax Corporation certifies that the following 40 rolls of TNT 507076 shipped to the above referenced project on 11/8/97, under Bill of Lading #5749 are in conformance with the attached Tenax Specifications and were manufactured according to the Tenax Manufacturing Quality Control / Quality Assurance Plan.

TENAX TNT 507076 (6.7' X 200')
ROLLS: 199-212
ROLLS: 223-248

Respectfully submitted,


Rahul Bandyopadhyay
Quality Control Manager**Performance in
Plastic TechnologySM**

DOUBLE-SIDED GEOCOMPOSITE
GEOTEXTILE + GEONET + GEOTEXTILE

Typical applications:

- leachate collection/detection systems in landfills - landfill cap drainage layer - gas venting media

PROPERTIES	TEST METHOD	UNIT	VALUE	Note
GEONET				
POLYMER DENSITY	ASTM D1505	g/cm ³	0.94	a
GEONET DENSITY	ASTM D792	g/cm ³	0.94	a
MELT FLOW INDEX	ASTM D1238	g/10 min	1	e
TRANSMISSIVITY	ASTM D4716	m ² /sec	1.0 x10 ⁻³	a,e
CARBON BLACK CONTENT	ASTM D4218	%	2-3	d
THICKNESS	ASTM D5199	mils	250	a
UNIT WEIGHT	ASTM D3776	lb/1000 ft ²	245	a
TENSILE STRENGTH	ASTM D4595	lb/in	70	a
COMPRESSION @ 15,000 psf	ASTM D5199	%	70	b
GEOTEXTILE				
WEIGHT	ASTM D3776	oz/yd ²	7.1	c
GRAB TENSILE STRENGTH	ASTM D4532	lbs	210	c
GRAB TENSILE ELONGATION	ASTM D4532	%	60	c
MULLEN BURST	ASTM D3736	psi	360	c
PUNCTURE	ASTM D4533	lbs	95	c
TRAPEZOIDAL TEAR	ASTM D4533	lbs	75	c
THICKNESS	ASTM D1777	mils	95	c
APPARENT OPENING SIZE (AOS)	ASTM D4751	US Sieve	70	c
PERMITTIVITY	ASTM D4491	sec ⁻¹	1.47	c
FLOW RATE	ASTM D4491	gal/min/ft ²	110	c
GEOCOMPOSITE				
PLY ADHESION	ASTM D413	lb/in	1.0	c
ROLL WIDTH	-	ft	6.7	a
ROLL LENGTH	-	ft	200	a
ROLL AREA	-	ft ²	1340	a

NOTES:

a) Minimum value

b) Typical value

c) Minimum Average Roll Value

d) Value Range

e) Transmissivity tested at a normal compressive stress of 15,000 psf and a gradient of 0.02, .

water temperature at 20°C, and configuration of Plate/Soil/Geotextile/Geonet/Geotextile/geomembrane

seating period of one hour

Tenax Corporation
4800 East Monument Street
Baltimore, Maryland 21205
tel (410) 522-7000
fax (410) 522-3977

TNT507076 950910 kk COMANCO

MASS POLYMERS CORPORATION

198 WEST HIGH STREET
SOMERVILLE, NJ 08876

(908) 725-3133
FAX (908) 725-9677

October 6, 1997

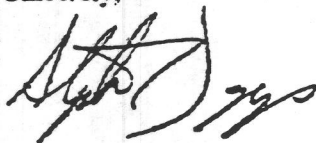
Mr. Kevin Kenny
Tenax Corporation
4800 E Monument Street
Baltimore, MD 21206

ORDER CONFIRMATION

Customer P.O. Number	1005
Product Type	HDPE
Manufacturer/Grade Number	Fina 7194 OG
Lot Number	73961
Railcar Number	ACFX 66030
Manufacturer Date	09/03/97
Delivery Date	10/06/97
Product Weight	179,900 lbs

<u>PROPERTY</u>	<u>RESULTS</u>	<u>ASTM TEST METHOD</u>
Melt Index (190/2.16)	0.5 g/10 min	D - 1238
Density	0.946 g/cm ³	D - 1505

Sincerely,



Stephen Dazzo

NEWTON, MA
(617) 964-9400

ROSWELL, GA
(770) 475-5678

OVERLAND PARK, KS
(913) 383-2121

CHICAGO, IL
(312) 943-0063

MQC/MQA TEST RESULTS

Product: TD5
 Lot #: 62940-62941
 Roll size: 6.7'X200'
 Job: VOLUSIA

Roll No.	Thickness ASTM D5199 (mils)	Unit Weight ASTM D3776 (g/m ²)	Density ASTM D792 (g/cm ³)	Carbon Black ASTM D4218 %	Tensile Strength ASTM D4595 (lb/ft)	Crush Strength ASTM D1621 15000 (psf)
9700899	295.4	1453	0.947	2.43	1347	74.30%
9700929	282.8	1387	0.951	2.42	1177.2	76.20%
9700954	283.2	1387	0.946	2.53	1223	77.50%
9700989	288.3	1468	0.949	2.55	1333.7	81.80%
9701011	282.8	1382	0.945	2.35	1241	82.40%
9701194	302.9	1411	0.945	2.8	1348.1	79.80%
9701225	291.1	1423	0.945	2.5	1133.8	78.05%
9701277	290.4	1413	0.942	2.4	1156.2	76.10%
9701306	286.2	1425	0.94	0.2	1179.2	76.40%
9701343	302.1	1581	0.947	2.2	1341.3	83.80%
9701393	277.8	1433	0.945	2.2	1284	73.80%
9701459	263	1482	0.942	2.3	1317	73.10%

AVG	287	1437	0.945	2.2	1257	77.77%
STDEV	11	55	0.003	0.7	81	3.50%
SPEC	250	1200	0.94	2	840	70.00%
	min.	min.	min.	min.	min.	min.

MQC/MQA TEST RESULTS

Product : TD5
 Lot # : 62940-62941
 Roll size : 6.7'X200'
 Job : VOLUSIA

Roll No.	Thickness ASTM D5199 (mils)	Unit Weight ASTM D3776 (g/m ²)	Density ASTM D792 (g/cm ³)	Carbon Black ASTM D4218 %	Tensile Strength ASTM D4595 (lb/ft)	Crush Strength ASTM D1621 15000 (psf)
9700025	321	1772	0.946	2.2	1182	79.00%
9700028	281	1479	0.952	2.75	1135	73.60%
9700031	276.1	1294	0.954	2.83	1204	82.10%

AVG	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
STDEV	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
SPEC	250	1200	0.94	2	840	70.00%
	min.	min.	min.	min.	min.	min.

STRAIGHT BILL OF LADING
ORIGINAL - NOT NEGOTIABLE

Shipped No. 11389



Carrier No. 10/20/97

U.S. Laminating
100 Wilbur Place
Babine NY

Shipper TNS ADVANCED TECHNOLOGIES
881 DeYoung Road
Greer, SC 29651

Rolls	End of Inventory, Description of Articles, Approximate Dates and Quantities	Quantity	Unit	Condition
2483	ROLLS OF POLYPROPYLENE GEOTEXTILES			
51	NMFC 48160 CLASS			
	TNS E071 090 A00	42,483	20,505	
	TL# 80205			

800-645-1149

SHIPPER TNS ADVANCED TECHNOLOGIES
PER Fred Gahan

CARRIER
PER Pickup
DATE

SHIPPER TNS ADVANCED TECHNOLOGIES
PER Fred Gahan

CARRIER
PER Pickup
DATE

937895-937944 / 977508-977510

937930	E071 090 A00	414	9	405
937931	E071 090 A00	412	9	403
937932	E071 090 A00	412	9	403
937933	E071 090 A00	398	9	389
937934	E071 090 A00	398	9	389
937935	E071 090 A00	387	9	376
937936	E071 090 A00	387	9	378
937937	E071 090 A00	385	9	376
937938	E071 090 A00	385	9	376
937939	E071 090 A00	390	9	381
937940	E071 090 A00	390	9	381
937941	E071 090 A00	397	9	388
937942	E071 090 A00	397	9	388
937943	E071 090 A00	387	9	378
937944	E071 090 A00	387	9	378
977508	E070 090 A00	408	10	398
977509	E070 090 A00	408	10	398
977510	E070 090 A00	416	10	406

"TEN20A" Totals: 20,505 462 20,043 51 Rolls----



681 DeYoung Road
Greer, South Carolina 29615
Tel: (864) 868-0582
Fax: (864) 879-1639
Toll Free: (800) 867-5181

October 22, 1997
REF: TNS E071
Quantity Shipped: 51
BOL#: 11389

US Laminating
100 Wilbur Place
Bohemia, NY

Dear Sir/Madam:

This is to certify that TNS E071 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS E071 is resistant to degradation due to ultraviolet exposure and resists commonly encountered soil chemicals, insects, mildew, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13. TNS E071 conforms to the physical properties listed in the following table:

<u>FABRIC PROPERTY</u>	<u>TEST METHOD</u>	<u>UNITS</u>	<u>M.A.R.V</u>
Weight	ASTM D 3776	oz/sy	7.1
Thickness	ASTM D 1777	mils	90
Grab Tensile	ASTM D 4632	lbs	210
Grab Elongation	ASTM D 4632	%	60
Trap Tear	ASTM D 4533	lbs	75
Puncture	ASTM D 4833	lbs	95
Permeability	ASTM D 4491	cm/sec	.35

Sincerely,

J. Melissa Keller
TNS Advanced Technologies

THE MILLS, INC.

Norman Quality Data

10/22/01

1000

Rel	W	Sta	Wd	Lvs	Frbr	Thph	Strg	Stng	Flng	Flng	Trap	Trap	Grnt	Flod	Part	AMS
							MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
937895		E071	090	A00	7.2	105	229	243	76	92	93	98	127	402	106	.02
937896		E071	090	A00	7.2	105	229	243	76	92	93	98	127	402	106	.02
937897		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937898		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937899		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937900		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937901		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937902		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937903		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937904		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937905		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937906		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937907		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937908		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937909		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937910		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937911		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937912		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937913		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937914		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937915		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937916		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937917		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937918		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937919		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937920		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937921		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937922		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937923		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937924		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937925		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937926		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937927		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937928		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937929		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937930		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937931		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937932		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937933		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937934		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42
937935		E071	090	A00	7.6	116	216	220	86	96	96	129	110	396	129	.42

10/22/97 Page 2

Nonwoven Quality Data

THE MILLS, Inc.

03-03-74	1445-1450	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1450-1455	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1455-1500	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1500-1505	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1505-1510	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1510-1515	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1515-1520	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1520-1525	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1525-1530	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1530-1535	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1535-1540	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1540-1545	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1545-1550	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1550-1555	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70
03-03-74	1555-1600	7.4	115	211	216	76	82	87	127	122	306	162	.66	2.4	70

STANDARD FORM NO. 1
ORIGINAL - NOT NEGOTIABLE

Shipment No. _____

Carrier No. _____

Date 12/14/57

7100 Hills

Camp

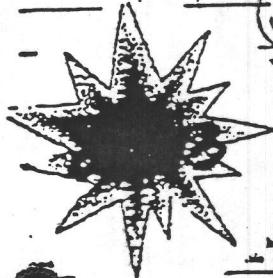


U.S. Laminating Corp
100 Wilbur Place
Bohemia, NY

FROM Shipper TNS ADVANCED TECHNOLOGIES
Address 681 DeYoung Road
City Greer, SC
Zip Code 29651

No. Shipping Units	Unit	Kind of Packaging, Description of Contents, Special Marks and Instructions	Weight (Pounds or Kilograms)	Volume (Cubic Feet or Meters)	Charges
		ROLLS OF POLYPROPYLENE GEOTEXTILES			
		NMFC 48160 CLASS			
50		TNS E070 090 A00	20,134	950	116,550

PO# 982



Under the terms of this bill of lading, the shipper is required to state specifically in the body of the bill of lading the property is hereby specifically stated by the shipper to be:

Under the terms of this bill of lading, the shipper is required to state specifically in the body of the bill of lading the property is hereby specifically stated by the shipper to be:

TOTAL CHARGES \$
FREIGHT CHARGES:
FREIGHT PREPAID ☒ FREIGHT COLLECT ☐

and with effect on the date of the issue of this bill of lading, the property described above is accepted and order, except as noted (contents and weight, marked, consigned, and deemed as indicated above which said carrier the word carrier being understood throughout this contract as meaning any person or persons under the contract agrees to come to the usual place of delivery or destination, if on its route, otherwise to deliver to another place on the route agreed to in each corner of all or any of, said property over all or any portion of said route to destination and on the date of shipment or service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment, be in conformity with all the bill of lading terms and conditions in the governing classification and the word terms and conditions are hereby agreed to by the shipper.

TO TNS ADVANCED TECHNOLOGIES
By Frank Gordon

CARRIER
PER Pickup
DATE

Mark with "X" to designate Hazardous Materials as defined in Title 49 of the Code of Federal Regulations.

977490	E070 090 A00	394	10	384
977491	E070 090 A00	394	10	384
977492	E070 090 A00	416	10	406
977493	E070 090 A00	416	10	406
977494	E070 090 A00	418	10	408
977495	E070 090 A00	418	10	408
977496	E070 090 A00	418	10	408
977497	E070 090 A00	418	10	408
977498	E070 090 A00	415	10	405
977499	E070 090 A00	415	10	405
977500	E070 090 A00	405	10	395
977501	E070 090 A00	405	10	395
977502	E070 090 A00	397	10	387
977503	E070 090 A00	397	10	387
977504	E070 090 A00	408	10	398
977505	E070 090 A00	408	10	398
977506	E070 090 A00	401	10	391
977507	E070 090 A00	401	10	391

"TEN14A" Totals: 20,136 500 19,636 50 Rolls----

Selected Rolls - Styles "TNS" thru "TNS9999999999",
Locations "TEN14A" thru "TEN14A". Batches " " thru "9999"

TNS Mills, Inc.

Nonoven Quality Data
B.O.L. B-11A36

10/14/97 Page 2

Roll	Styl	Hdr	Ln	Depth	Thck	Strg	Strg	Clng	Clng	Trop	Trop	Puno	Bret	Flow	Perm	Perm	ACS
						MC	XMD	MD	XMD	MD	XMD	Real	Stg	Rate	abl	sty	
977458	E070	090	A00	7.3	138	219	236	03	116	92	127	133	423	119	.36	1.6	80
977452	E070	090	A00	7.3	122	219	223	09	107	83	98	121	411	129	.38	1.7	80
977458	E070	090	A00	7.2	108	210	221	90	104	05	122	120	419	122	.35	1.6	80
977472	E070	090	A00	7.2	98	229	223	72	04	03	92	119	410	119	.38	1.5	90
977472	E070	090	A00	7.3	98	223	236	60	72	79	03	119	429	119	.38	1.5	80
977480	E070	090	A00	7.2	107	223	236	80	96	83	92	121	410	120	.64	2.0	80
977491	E070	090	A00	8.1	123	221	226	86	100	09	148	144	410	120	.37	1.5	80
977494	E070	090	A00	7.6	111	213	208	77	95	97	116	125	427	125	.38	1.6	80
977489	E070	090	A00	7.6	98	229	236	62	60	03	79	127	420	119	.38	1.6	80
977602	E070	090	A00	7.5	111	216	226	74	98	03	98	133	419	119	.38	1.6	80



881 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 988-0582
Fax: (864) 878-4539
Toll Free: (800) 867-5181

October 16, 1997
REF: TNS E070
Quantity Shipped: 50 rolls
BOL#: 11436

Tenax Corp.
4800 E. Monument St.
Baltimore, MD 21205

Dear Sir/Madam:

This is to certify that TNS E070 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS E070 is resistant to degradation due to ultraviolet exposure and resists commonly encountered soil chemicals, insects, mildew, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13. TNS E070 conforms to the physical properties listed in the following table:

<u>FABRIC PROPERTY</u>	<u>TEST METHOD</u>	<u>UNITS</u>	<u>M.A.R.V</u>
Weight	ASTM D 3776	oz/sy	7.1
Thickness	ASTM D 1777	mils	95
Grab Tensile	ASTM D 4632	lbs	210
Grab Elongation	ASTM D 4632	%	60
Trap Tear	ASTM D 4533	lbs	75
Puncture	ASTM D 4833	lbs	95
Mullen Burst	ASTM D 3786	psi	360
A.O.S.	ASTM D 4751	U.S. Sieve	70
Permittivity	ASTM D 4491	1/sec	1.47
Water Flow	ASTM D 4491	gpm/sq.ft.	110
Permeability	ASTM D 4491	cm/sec	.35

Sincerely,

A handwritten signature in dark ink, appearing to read "J. Melissa Keller".

J. Melissa Keller
TNS Advanced Technologies



681 DeYoung Road
Greer, South Carolina 29651
Tel: (864) 968-0592
Fax: (864) 879-4639
Toll Free: (800) 867-5181

November 4, 1997
REF: TNS E071
Quantity Shipped: 40 rolls
BOL#: 11471

US Laminating
100 Wilbur Road
Bohemia, NY

Dear Sir/Madam:

This is to certify that TNS E071 is a 100% polypropylene, nonwoven, needle-punched fabric. TNS E071 is resistant to degradation due to ultraviolet exposure and resists commonly encountered soil chemicals, insects, mildew, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13. TNS E071 conforms to the physical properties listed in the following table:

<u>FABRIC PROPERTY</u>	<u>TEST METHOD</u>	<u>UNITS</u>	<u>M.A.R.V.</u>
Weight	ASTM D 3776	oz/sy	7.1
Thickness	ASTM D 1777	mils	90
Grab Tensile	ASTM D 4632	lbs	210
Grab Elongation	ASTM D 4632	%	60
Trap Tear	ASTM D 4533	lbs	75
Puncture	ASTM D 4833	lbs	95
Permeability	ASTM D 4491	cm/sec	.35

Sincerely,

J. Melissa Keller
TNS Advanced Technologies

ORIGINAL - NOT NEGOTIABLE

Shipper No. 11111

Carrier No. 10/29/97

Date 10/29/97

Camp

(Name of Carrier)



TO: US Laminating		FROM: TNS ADVANCED TECHNOLOGIES	
100 Wilbur Road		681 DeYoung Road	
Bohemia NY		Greer, SC	
Zip Code		Zip Code 29651	

Item	Shipping Unit	MTL	Kind of Packaging, Description of Articles, Serial Marks and Numbers	Weight (Collect to Commodity)	DATE	CHARGES
			ROLLS OF POLYPROPYLENE GEOTEXTILES			
24863			NMFC 48100 CLASS			
40	1		TNS E071 090 A00	15 856		
			TL4 90297			
			800-645-1149			

Note - Where the rate is dependent on value, shippers are required to state satisfactorily in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby satisfactorily stated by the shipper to be not exceeding

\$ 100.00

Not to exceed 7 of the conditions of the contract, it is understood that the shipper shall sign the following statement:

The carrier shall not make delivery of this shipment without payment of freight and in full of all charges.

(Signature of Carrier)

TOTAL

CHARGES: \$

FREIGHT CHARGES:

FREIGHT PREPAID FREIGHT COLLECT

☐☐

RECEIVED, subject to the classification and tariffs in effect on the date of the issue of this bill of lading, the property described above in accordance with order, receipt as noted, receipt and condition of contents of packages unknown, marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract agreed to carry to its usual place of delivery at said destination, it on its route, otherwise to deliver to another person on the route to said destination if it is mutually agreed as to each portion of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every receipt to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER: TNS ADVANCED TECHNOLOGIES		CARRIER:	
Ted Grubbs		PICK UP	
DATE			

BLOC-4024

* Mark with "X" to designate Hazardous Material as defined in Title 49 of the Code of Federal Regulations.

TEN29C

978376-978442

978434	E071	090	A00	407	9	318
978435	E071	090	A00	409	9	400
978436	L071	090	A00	409	9	400
978437	E071	090	A00	410	9	401
978438	E071	090	A00	410	9	401
978439	E071	090	A00	412	9	403
978440	E071	090	A00	412	9	403
978441	E071	090	A00	416	9	407
978442	E071	090	A00	416	9	407

"TEN29C" Totals: 15,896 560 15,896 40 ROLLS

Selected Rolls - Styles "INS" thru "INS079999999", Locations "TEN29C" thru "TEN29C", Batches " " thru "97999"

TRANSMISSIVITY TEST DATA

ASTM D-4716

TEST CONFIGURATION

TOP PLATE
SOIL
TNT507076
GEOMEMBRAIN
BOTTOM PLATE

Date : 10/10/97

Specimen Size : 12'X14'

Product : TNT507076

Roll No. : 212

Job : VOLUSIA

Geonet Specimen Thickness : 260.2mils

Unit Weight (g/m²) 1291

Load (psf)	Seating	Temp (oC)	Gradient	Q ₁ (l/min)	Q ₂ (l/min)	Q _{avg} (l/min)	θ (m ² /s)
15000	1 HOUR		0.02	0.54	0.54	0.54	1.48E-03

TENAX CORPORATION

GEOCOMPOSITE REPORT

PRODUCT : TNT 507076
 JOB: VOLUSIA#6
 P.O. #: 62940-62941
 DATE: 10-Nov

W/O: 10-207-7
 NET TYPE: TD-5
 TEXTILE 1: TNS E070/71
 TEXTILE 2: TNS E070/71

TEXTILE #	NET #	TEXTILE #	COMPOSITE #	SHIPPED FEET
977487	9700026	977484	199	200
977487	9700026	977484	200	200
977487	9700026	977484	201	200
977487	9700026	977484	202	200
977487	9700026	977491	203	200
977490	9700031	977491	204	200
977490	9700031	977491	205	200
977490	9700031	977491	206	200
977490	9700031	977469	207	200
977480	9700031	977469	208	200
977480	9700031	977469	209	200
977480	9700029	977469	210	200
977480	9700029	977469	211	200
977480	9700029	977469	212	200
978400	954	978430	223	195
978400	910	978430	224	198
978400	911	978430	225	195
978400	930	978430	226	192
978400	956	978430	227	192
978400	1407	978429	228	195
978389	964	978385	229	195
978389	955	978385	230	192
978389	1218	978385	231	195
978391	1195	978385	232	192
978391	881	978385	233	195
978385	882	978432	234	195
978389	923	978432	235	195
978389	1261	978432	236	192
978391	1391	978432	237	195
978391	990	978432	238	195
978393	1299	978388	239	195
978393	1301	978388	240	195
978429	1203	978388	241	195
978393	1208	978388	242	195
978393	1192	978388	243	195
978393	915	978380	244	192
978429	1265	978380	245	195
978429	1190	978380	246	192
978429	1266	978380	247	195
978429	1264	978308	248	192

COMPOSITE ROLL #'s 199-212 LAMINATED AT TENAX

Att:Christine/Lab
U. S. Laminating Peel Test Summary

Product: TNT 507076

Job: Velusia Waste Disposal

Specimen Size:2"x10"

Required bond: 1 Pound Per Inch

Crosshead Speed:2"/min

Roll #	Pass #	Pounds per inch for test strip #					Average bond strength pounds per inch
		1	2	3	4	5	
1	1	.93	3.0	1.5	1.5	.80	1.6
	2	1.3	.61	1.4	1.4	1.1	1.2
30	1	1.9	1.7	1.2	1.3	.64	1.3
	2	1.7	1.3	1.2	1.1	1.2	1.3
60	1	2.1	.93	1.4	1.2	1.6	1.5
	2	2.0	.89	1.9	1.1	1.8	1.5
90	1	1.4	3.6	2.0	2.0	2.3	2.3
	2	2.9	4.6	3.4	1.7	1.7	2.9
120	1	1.1	.61	1.3	1.1	1.2	1.1
	2	.70	1.0	1.5	1.1	.90	1.0
150	1	2.4	.93	.84	1.0	.71	1.2
	2	.70	.72	.83	2.4	2.1	1.4
180	1	1.5	2.6	1.9	1.7	1.4	1.8
	2	3.1	3.1	2.7	3.0	1.6	2.7
210	1	.40	2.3	2.4	2.2	1.4	1.7
	2	1.1	1.9	1.6	1.9	1.3	1.6
240	1	1.4	1.6	2.0	1.3	1.7	1.6
	2	1.0	1.2	1.1	.80	.80	1.0
270	1	2.7	1.4	1.1	2.0	.50	1.5
	2	2.4	2.8	4.4	2.6	1.6	2.8

Test Conducted by:

Jason Chaperuk

Signature

Date

11/10/87

TRANSMISSIVITY TEST DATA

ASTM D-4716

TEST CONFIGURATION

TOP PLATE
SOIL
TNT507076
GEOMEMBRAIN
BOTTOM PLATE

Date : 10/10/97

Specimen Size : 12'X14'

Product : TNT507076

Roll No. : 240

Job : VOLUSIA

Geonet Specimen Thickness : 268.9mils

Unit Weight (g/m²) 1414

Load (psf)	Seating	Temp (oC)	Gradient	Q ₁ (l/min)	Q ₂ (l/min)	Q _{avg} (l/min)	θ (m ² /s)
15000	1 HOUR		0.02	0.65	0.65	0.65	1.77E-03

ATTACHMENT 6-8

PRECISION TRI-PLANAR GEOCOMPOSITE CONFORMANCE TEST RESULTS

SCS ENGINEERS

GEOSYNTHETICS MATERIALS INVENTORY CHECKLIST

Project: TOMOKA FARMS RD. L.F.N. CELLDate: 2/23/02Client: VOLUSIA COUNTY, FLMaterial type: TRI PLAYER COMPOSITE 570-2Project No.: 9198052.12Manufacturer: TENAX

SCS ID#	Lot Number	Roll Number	Dimensions	Comments	Conformance Sample #
1	# 1	200201	6.7 X 200	2/1/02 1340	#3
2		202			
3		203			
4		204			
5		205			
6		206			
7		207			
8		208			
9		209	✓		
10		210	6.7 X 179		
11		211	6.7 X 200		
12		212			
13		213			
14		214			
15		215			
16		216			
17		217			
18		218			
19		219	✓		
20		220	6.7 X 105		
21		221	6.7 X 200		
22	✓	222	↓		

Totals

28,702.8

Notes:

SCS ENGINEERS

GEOSYNTHETICS MATERIALS INVENTORY CHECKLIST

Project: TOMOKA FARMS RD. L.F.N. CELLDate: 2/23/02Client: VOLUSIA COUNTY, FLMaterial type: TRI PAPER COMPOSITE 570-2Project No.: 9198052.12Manufacturer: TONAX

SCS ID#	Lot Number	Roll Number	Dimensions	Comments	Conformance Sample #
23	# 1	200 223	6.7 x 200		
24		224			
25		225			
26		226			
27		227			
28		228			
29		229			
30		230			
31		231			
32		232			
33		233			
34		234			
35		235			
36		236			
37		237			
38		238	✓		
39		239	6.7 x 154		
40		240	6.7 x 200		
41		241			
42		242			
43		243			
44		244	↓		

Totals

29171.8

Notes:

SCS ENGINEERS

GEOSYNTHETICS MATERIALS INVENTORY CHECKLIST

Project: TOMOKA FARMS RD. L.F.N. C&GDate: 2/23/02Client: VOLUSIA COUNTY, FLMaterial type: TRI PAPER COMPOSITE 570-2Project No.: 9198052.12Manufacturer: TENAX

SCS ID#	Lot Number	Roll Number	Dimensions	Comments	Conformance Sample #
45	#1	220 245	6.7 X 200		
46		246			
47		247			
48		248	↓		
49		249	6.7 X 125		
50		250	6.7 X 200		
51		251			
52		252			
53		253			
54		254			
55		255			
56		256			
57		257			
58		258			
59		259			
60		260			
61		261			
62		262			
63		263			
64		264			
65		265			
66	↓	↓	↓		

Totals

28,977.5

Notes:

SCS ENGINEERS

GEOSYNTHETICS MATERIALS INVENTORY CHECKLIST

Project: TOMOKA FARMS RD. L.F.N. CELLDate: 2/23/02Client: VOLUSIA COUNTY, FLMaterial type: TRI PLAYER COMPOSITE 570-2Project No.: 9198052.12Manufacturer: TENAX

SCS ID#	Lot Number	Roll Number	Dimensions	Comments	Conformance Sample #
67	#1	230	267	6.7 X 147	
68			268	6.7 X 200	
69			269		
70			270		
71			271		
72			272		
73			273		
74			274		
75			275	↓	
				TOTAL 98,557 SF	
76	#2	230	276	6.7 X 200	#2
77			277	6.7 X 151	
78			278	6.7 X 200	
79			279		
80			280		
81			281		
82			282		
83			283		
84			284		
85			285		
86			286		
87			287		
88			288		

Totals

23,796.6

Notes: